NATIONAL SURVEY OF BURNER FUEL OILS, 1956

By O. C. Blade

Information Circular 7762

UNITED STATES DEPARTMENT OF THE INTERIOR
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INTRODUCTION

This report on the properties of burner-fuel oils produced during 1956 was issued under a cooperative agreement between the American Petroleum Institute and the Bureau of Mines, United States Department of the Interior, at the request of the Oil-Heat Institute of America and the petroleum industry. This survey is the second for this type of fuel, the first being made in 1955. 2/ The surveys are conducted to provide information on the characteristics of burner-fuel oils now manufactured for sale. They are similar in pattern to the diesel-fuel surveys, conducted since 1950, 3/ and are not intended to conflict with but rather to supplement them. The importance of fuel oil has resulted in the need for more information by the petroleum industry, manufacturers of heating appliances, and consumers regarding the types and qualities of the fuels currently being marketed.

Samples of burner-fuel oil typical of their manufacture during the early part of 1956 were analyzed by the refiners in accordance with instructions from the subcommittee on fuel surveys of the Automotive Research Committee of the American Petroleum Institute. Results of the analyses were transmitted to the Bureau of Mines where the data were studied and compiled as shown in the tables of this report.

SUMMARY

Data on a total of 427 samples of burner-fuel oil are represented. The fuels were manufactured by 45 petroleum refining companies, large and small, in 123 refineries throughout the country and in Canada. The data are divided into five groups according to the stated grade of burner-fuel oil, and each group is subdivided into 5 tabulations according to the geographic marketing distribution

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2/ Blade, O. C., National Survey of Burner Fuel Oils, 1955: Bureau of Mines Inf. Circ. 7730, 1955, 20 pp. (In cooperation with the American Petroleum Institute).

3/ Blade, O. C., National Annual Diesel Fuel Surveys, 1950-55: Bureau of Mines Repts. of Investigations 4746, 1950, 25 pp.; 4830, 1951, 12 pp.; 4935, 1952, 22 pp.; 5008, 1953, 24 pp.; 5084, 1954, 24 pp.; and Inf. Circ. 7737, 1955, 24 pp. (In cooperation with the American Petroleum Institute).

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of the various fuels represented. The geographic areas are five general regions of the country containing 14 marketing districts. The areas are shown on the map (fig. 1) and are the same as used in the current diesel-fuel surveys.

Summaries of the results of the tests by grades and by regions, compared with data for 1955, are shown in tables 1 through 5. Average values of selected properties are shown for the number of fuels represented, and minimum and maximum figures are given for all the tests indicated, where possible.

EXPLANATION OF TABLES AND FIGURES

Twelve laboratory tests, selected by the subcommittee on fuel surveys of the Automotive Research Committee of the API in consultation with the subcommittee on fuel oil characteristics of the Oil-Heat Institute Technical Division and made by procedures approved by the American Society for Testing Materials, 4/ were used to analyze the samples of burner-fuel oils in this survey. By agreement with the cooperating agencies, identification of the items is confidential.

Each item in tables 6 through 10 is a complete analysis of one sample of burner-fuel oil. The tables are arranged in five groups, according to the grade designations 1, 2, 4, 5, and 6 stated by the manufacturer. Each group of data is subdivided into five tabulations according to the geographic marketing distribution of the fuels represented. The geographic areas are made up of five general regions divided into 14 marketing districts as follows:

Region	Districts
Eastern	A, B, C
Southern	D
Central	E, F, G
Rocky Mountain	H, I, J, K
Western	L, M, N

4/ American Society for Testing Materials, ASTM Standards 1955, Part 5, Philadelphia, 1955, 1,460 pp.

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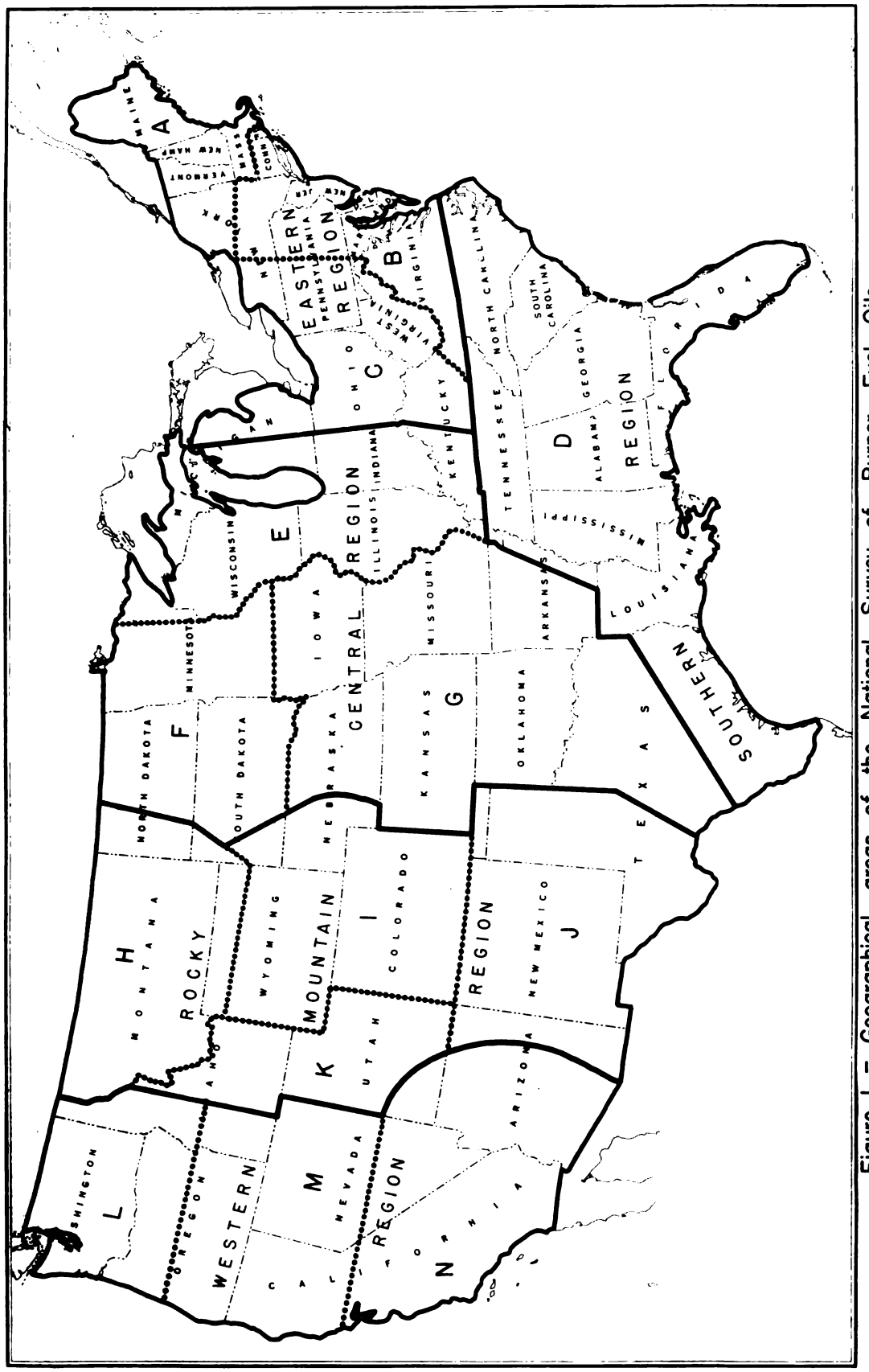

Figure I. – Geographical areas of the National Survey of Burner Fuel Oils.

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TABLE 1.--Summary of grade 1 fuels

Burner fuel oil survey, 1956

Geographic distribution of burner fuel oils 1/				Eastern region A, B, C 2/ D, E, G			Southern region D A, B, C, E, F, G			Central region E, F, G A, B, C, D, H, I, J			Rocky Mountain region H, I, J, K 3/ E, F, G, L, M, N			Western region L, M, N H, I 3/		
Districts within region																		
Additional districts 4/																		
Number of fuels				41			13			46			26			26		
	ASTM D396 requirements																	
Test	Method	Min.	Max.	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
Gravity ——— ——— ——— ——— ——— ° API	D287	35	-	36.3	42.3	44.6	36.3	42.1	44.5	36.3	42.3	44.6	38.6	41.9	44.9	34.8	39.3	44.5
Flash point, Tag closed tester ——— ——— ° F.	D56 5/	100	-	123	-	158	126	-	141	123	-	158	126	-	158	120	-	185
Viscosity																		
Kinematic at 100° F.——— centistokes	D445	1.4	2.2	1.57	1.82	2.43	1.52	1.78	2.43	1.57	1.82	2.43	1.38	1.77	2.35	1.50	1.87	2.22
Cloud test ——— ——— ——— ——— ——— ——— ° F.	D97	-	-	-50	-	-10	-54	-	-15	-50	-	-10	-60	-	-15	-60	-	-20
Pour point ——— ——— ——— ——— ——— ——— do.	D97	-	0	-60	-	<-10	-60	-	<-15	-60	-	-10	-55	-	-20	-65	-	0
Sulfur content ——— ——— ——— wt. percent	D129	-	0.5	0.015	0.117	0.574	0.015	0.087	0.30	0.011	0.117	0.574	0.011	0.20	0.96	0.01	0.236	0.96
Aniline point ——— ——— ——— ——— ° F.	D611	-	-	140	151.3	161.2	140	148.0	154	140	151.3	161.2	137	146.6	157	121.0	141.6	159.4
Ramsbottom carbon residue																		
on 10 percent residue ——— ——— percent	D524	-	0.15	0.0	0.064	0.15	0.01	0.054	0.09	0.0	0.064	0.15	0.00	0.057	0.104	0.02	0.067	0.13
Corrosion, 3 hours at 122° F.	D130	-	3	1A	-	1	<1A	-	3	1A	-	1	1A	-	1	1A	-	2
Ash 6/	D482	-	-	0.000	0.000	0.0	0.000	0.000	0.0	0.000	0.000	0.04	0.000	0.000	0.04	0.000	0.000	<0.01
Water and sediment ——— ——— vol. percent	D96	-	Trace	.000	.000	<0.1	0.00	0.00	<0.1	.000	.000	<0.1	0.00	0.00	<0.1	0.00	0.00	<0.1
Distillation test,																		
on volume recovered basis:	D86																	
Initial boiling point ——— ———° F.		-	-	320	354	382	320	346	370	320	354	382	326	353	382	312	347	380
10 percent		-	420	360	388	428	362	382	428	360	388	428	362	389	422	362	391	420
50 percent		-	-	414	439	486	413	433	486	414	439	486	393	434	481	395	440	471
90 percent		-	-	453	507	554	466	498	554	453	507	554	440	499	552	440	505	543
End point		-	625	496	547	602	504	536	602	496	547	602	474	546	620	474	551	620

Burner fuel oil survey, 1955 7/

Geographic distribution of burner fuel oils 1/				Eastern region A, B, C D, E, G			Southern region D A, B, C, E, G			Central region E, F, G C, D, H, I, K, L			Rocky Mountain region H, I, J, K E, F, G, L, M			Western region L, M, N F, H, I, K		
Districts within region																		
Additional districts 4/																		
Number of fuels				25			8			35			19			15		
	ASTM D396 requirements																	
Test	Method	Min.	Max.	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
Gravity ——— ——— ——— ——— ——— ° API	D287	35	-	40.6	43.6	48.5	41.2	42.7	44.6	38.8	42.3	44.6	39.1	42.3	44.6	35.2	38.5	42.7
Flash point, Tag closed tester ——— ———° F.	D56 5/	100	-	114	-	150	128	-	146	122	-	162	120	-	150	125	-	185
Viscosity																		
Kinematic at 100° F. ——— centistokes	D445	1.4	2.2	1.27	1.62	2.0	1.59	1.72	1.9	1.54	1.80	2.3	1.47	1.67	1.99	1.54	1.89	2.2
Cloud test ——— ——— ——— ——— ——— ° F.	D97	-	-	-56	-	0	-44	-	<0	-56	-	20	<-50	-	-10	-56	-	-20
Pour point ——— ——— ——— ——— ——— do.	D97	-	0	-60	-	<0	-55	-	-35	-60	-	-10	-55	-	-20	<-60	-	<-20
Sulfur content ——— ——— ——— wt. percent	D129	-	0.5	0.025	0.089	0.272	0.025	0.048	0.10	0.025	0.140	0.50	0.018	0.188	0.94	0.01	0.303	0.94
Aniline point ——— ——— ——— ———° F.	D611	-	-	143.5	151.1	168.8	146	150	152	135.9	149.6	159	135.9	145.9	155	120	139.4	155
Ramsbottom carbon residue																		
on 10 percent residue ——— ——— percent	D524	-	0.15	0.00	0.059	0.13	0.01	0.051	0.13	0.01	0.067	0.123	0.002	0.056	0.105	0.03	0.075	0.11
Corrosion, 3 hours at 122° F.	D130	-	3	0	-	1	0	-	1	0	-	1	0	-	1	0	-	2
Ash	D482	-	-	0.000	0.000	0.001	0.00	0.000	<0.001	0.000	0.000	0.004	0.00	0.000	0.001	0.00	0.000	<0.01
Water and sediment ——— ——— vol. percent	D96	-	Trace	0.00	0.00	<0.1	0.00	0.00	<0.1	0.00	0.00	Trace	0.00	0.00	Trace	0.00	0.00	Trace
Distillation test,																		
on volume recovered basis:	D86																	
Initial boiling point ——— ———° F.		-	-	320	341	366	332	345	366	317	347	387	317	349	382	323	350	396
10 percent		-	420	350	376	399	364	379	392	360	385	423	360	385	410	362	399	420
50 percent		-	-	397	424	462	416	427	448	416	437	464	403	431	461	410	447	466
90 percent		-	-	443	488	540	468	492	524	468	506	540	465	495	551	451	508	549
End point		-	625	496	531	576	502	527	550	502	548	585	496	545	580	487	553	586

1/ Regions and districts are shown on map (Fig. 1).
2/ Included are analyses of three fuels produced and distributed in eastern Canada, north of districts A and C.
3/ Included are analyses of five fuels produced and distributed in western Canada, north of districts H and L.
4/ Some of the fuels are sold in districts of more than one region.
5/ This method was selected for grade 1 burner fuel oils for the survey although ASTM D396-48T, Tentative Specifications for Fuel Oils, specifies flash point by the Pensky-Martens Closed Tester (ASTM D93).
6/ Figures for ash are not shown in the tables of detailed analyses as they were not required for this grade. However, some data, less than one-third of the analyses, contained results of the test which are summarized here.
7/ This summary of burner fuel oils of 1955 differs from that shown in IC 7730 in that several figures of some properties not meeting the requirements of fuels of that grade were omitted from the computations but are now included similar to the data for 1956.

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TABLE 2.--Summary of grade 2 fuels

Burner fuel oil survey, 1956

Geographic distribution of burner fuel oils 1/				Eastern region A, B, C 2/ D, E, G			Southern region D A, B, C, E, F, G			Central region E, F, G A, B, C, D, H, I, J			Rocky Mountain region H, I, J, K 3/ F, G, L, M, N			Western region L, M, N H, I, K 3/		
Districts within region																		
Additional districts 4/																		
Number of fuels				56			17			45			20			26		
Test	ASTM D396 requirements Method	Min.	Max.	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
Gravity — ——— ——— ——— ——— ° API	D287	26	-	27.4	34.9	44.3	30.7	34.3	47.2	27.4	34.6	40.1	24.1	35.5	41.6	24.1	34.1	41.6
Flash point, Pensky-Martens closed tester—° F.	D93	100	-	134	-	222	140	-	222	128	-	222	135	-	215	130	-	230
Viscosity																		
Kinematic at 100° F.— ——— —centistokes	D445	-	4.3	2.1	2.68	3.5	2.1	2.54	3.25	1.7	2.55	3.33	1.77	2.56	3.44	1.50	2.90	4.48
Cloud test ——— ——— ——— ——— — ° F.	D97	-	-	-12	-	30	-35	-	14	-14	-	16	-35	-	10	-50	-	28
Pour point ——— ——— ——— ——— — do.	D97	-	20	-30	-	20	-45	-	0	-20	-	0	-40	-	5	<-40	-	25
Sulfur content ——— ——— — ———wt. percent	D129	-	1.0	0.052	0.330	1.02	0.05	0.326	0.64	0.066	0.339	0.931	0.06	0.496	1.4	0.14	0.513	1.4
Aniline point ——— ——— ——— ° F.	D611	-	-	100.0	142.6	176	120	137.8	168	111.2	137.9	162	69	138.1	158	69	136.3	158.7
Ramsbottom carbon residue																		
on 10 percent residue——— ——— — percent	D524	-	0.35	0.01	0.137	0.30	0.06	0.158	0.29	0.05	0.140	0.23	0.003	0.093	0.17	0.06	0.112	0.25
Corrosion, 3 hours at 122° F.	D130	-	-	1A	-	3	1	-	3	1A	-	1	1A	-	1	1A	-	2
Ash 5/ ——— ——— ——— ——— —percent	D482	-	-	0.000	0.000	0.003	0.00	0.000	0.002	0.000	0.000	0.002	0.000	0.000	Trace	0.00	0.000	<0.01
Water and sediment ——— ———vol. percent	D96	-	0.10	0.00	0.00	<0.1	0.00	0.00	<0.1	0.000	0.00	<0.1	0.00	0.00	<0.1	0.00	0.00	<0.1
Distillation test,																		
on volume recovered basis:	D158																	
Initial boiling point—— ——— —° F.		-	-	316	364	450	316	355	450	316	365	450	332	379	457	312	375	457
10 percent		-	6/ 440	387	432	487	386	426	480	378	430	483	379	435	474	370	436	498
50 percent		-	-	459	505	543	431	499	522	470	504	543	432	491	523	409	499	564
90 percent		-	675	552	585	635	457	579	610	549	579	610	485	563	624	460	578	650
End point		-	-	600	636	675	530	632	663	596	627	674	533	614	677	491	632	714

Burner fuel oil survey, 1955 7/

Geographic distribution of burner fuel oils 1/				Eastern region A, B, C 2/ D, E, G			Southern region D A, B, C, E, G			Central region E, F, G B, C, D, H, I, K, L			Rocky Mountain region H, I, J, K E, F, G, L, M			Western region L, M, N F, H, I, K		
Districts within region																		
Additional districts 4/																		
Number of fuels				40			11			36			17			20		
Test	ASTM D396 requirements Method	Min.	Max.	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
Gravity ——— ——— ——— ——— ° API	D287	26	-	29.0	35.9	44.7	30.3	34.8	36.9	29.5	35.4	39.5	25.8	35.9	41.8	25.8	34.1	41.8
Flash point, Pensky-Martens closed tester—° F.	D93	100	-	126	-	206	134	-	172	134	-	218	135	-	210	134	-	230
Viscosity																		
Kinematic at 100° F.——— —centistokes	D445	-	4.3	2.05	2.61	3.30	2.05	2.44	2.92	2.05	2.54	3.34	1.77	2.55	3.65	1.60	2.97	4.3
Cloud test ——— ——— ——— ——— — ° F.	D97	-	-	-15	-	18	-2	-	12	-22	-	15	-40	-	5	-40	-	28
Pour point ——— ——— ——— ——— — do.	D97	-	20	-20	-	10	-10	-	0	-25	-	0	-40	-	0	<-60	-	20
Sulfur content ——— ——— ———wt. percent	D129	-	1.0	0.03	0.345	1.15	0.05	0.339	0.60	0.056	0.330	0.96	0.05	0.493	1.3	0.17	0.545	1.3
Aniline point ——— ——— ——— ° F.	D611	-	-	118.0	145.4	176.0	118.0	139.1	156	116	140.1	165	87	139.4	160	87	139.4	160
Ramsbottom carbon residue																		
on 10 percent residue——— ———percent	D524	-	0.35	0.003	0.121	0.36	0.03	0.123	0.23	0.03	0.122	0.24	<0.06	0.098	0.22	<0.06	0.097	0.17
Corrosion, 3 hours at 122° F.	D130	-	-	0	-	1	0	-	4	0	-	1	0	-	1	0	-	2
Ash ——— ——— ——— ——— percent	D482	-	-	0.000	0.001	0.01	0.0	0.003	0.01	0.000	0.001	0.01	0.000	0.000	0.000	0.00	0.000	<0.01
Water and sediment ——— ——— —vol. percent	D96	-	0.10	0.00	0.00	<0.1	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	Trace	0.00	0.00	Trace
Distillation test,																		
on volume recovered basis:	D158																	
Initial boiling point—— ——— ——— ° F.		-	-	318	355	460	321	340	370	300	358	460	329	371	405	336	375	440
10 percent		-	6/ 440	368	425	486	373	415	438	368	424	491	393	432	464	384	439	490
50 percent		-	-	461	501	538	480	499	513	468	502	544	439	495	521	410	504	558
90 percent		-	675	555	584	630	565	587	618	537	578	618	464	567	624	451	582	648
End point		-	-	592	638	668	613	640	675	558	625	675	510	617	676	487	636	708

1/ Regions and districts are shown on map (fig. 1). 2/ Included are analyses of three fuels produced and distributed in eastern Canada, north of districts A and C.
3/ Included are analyses of two fuels produced and distributed in western Canada, north of districts H and L. 4/ Some of the fuels are sold in districts of more than one region.
5/ Figures for ash are not shown in the tables of detailed analyses as they were not required for the grade. However, some data, less than one-half of the analyses, contained results of the test which are summarized here.
6/ Footnote in table 1 of ASTM D396-48T: "The 10 percent point may be specified at 440 F. maximum for use in other than atomizing burners."
7/ This summary of burner fuel oils of 1955 differs from that shown in IC 7730 in that several figures of some properties not meeting the requirements of fuels of that grade were omitted from the computations but are now included similar to the data for 1956.

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TABLE 3.--Summary of grade 4 fuels

Burner fuel oil survey, 1956

Geographic distribution of burner fuel oils 1/				Eastern region			Southern region	Central region			Rocky Mountain region			Western region		
Districts within region				A, B, C 2/			D	E, F, G			H, I, J, K			L, M, N		
Additional districts 3/				D, E			B	C			L			H, I, J, K		
Number of fuels				25			1	8			2			1		
	ASTM D396 requirements															
Test	Method	Min.	Max.	Minimum	Average	Maximum	(Data on 1 sample)	Minimum	Average	Maximum	Minimum	Average	Maximum	(Data on 1 sample)		
Gravity ——— ° API	D287	-	-	8.7	21.2	33.2	21.7	8.7	22.4	36.3	23.7	(4)	30.0	30.0		
Flash point, Pensky-Martens closed tester ——° F.	D93	130	-	152	-	>230	216	156	-	225	200	-	200	200		
Viscosity,																
kinematic at 100° F. —— centistokes	D445	5.8	26.4	4.49	14.17	25.4	10.2	2.38	13.97	23.6	4.4	-	5/ (15)	4.4		
Cloud test ——— ° F.	D97	-	-	65	-	-	-	-	-	-	-	6/10	-	10		
Pour point —— do.	D97	-	20	-	-	20	0	-30	-	25	-20	-	0	0		
Sulfur content —— wt. percent	D129	-	-	0.23	0.759	2.10	0.9	0.328	0.946	1.62	1.48	-	2.2	2.2		
Aniline point —— ° F.	D611	-	-	-	6/116.2	-	-	-	-	-	-	6/142	-	142		
Ramsbottom carbon residue																
on 100 percent sample —— percent	D524	-	-	0.19	3.06	7.35	0.4	0.111	4.13	6.5	0.07	-	2.46	0.07		
Corrosion, 3 hours at 122° F.	D130	-	-	-	6/ 1A	-	-	-	-	-	-	6/ 1	-	1		
Ash ——— percent	D482	-	0.10	0.000	0.014	0.05	0.001	0.00	0.025	0.082	0.00	-	0.002	0.00		
Water and sediment —— vol. percent	D96	-	0.50	0.0	0.14	0.4	Trace	0.00	0.08	0.1	0.0	-	0.1	0.0		
Distillation test																
on volume recovered basis:	D158															
Initial boiling point —— ° F.		-	-	375	(4)	448	448	-	6/ 388	-	-	6/528	-	528		
10 percent		-	-	463	-	620	620	-	438	-	-	557	-	557		
50 percent		-	-	535	-	674	674	-	522	-	-	558	-	588		
90 percent		-	-	716	-	730	716	-	598	-	-	635	-	635		
End point		-	-	>760	-	840	>760	-	655	-	-	686	-	686		

Burner fuel oil survey, 1955 7/

Geographic distribution of burner fuel oils 1/				Eastern region			Southern region			Central region			Rocky Mountain region			Western region		
Districts within region				A, B, C			D			E, F, G			H, I, J, K			L, M, N		
Additional districts 3/				D, E			B			H, K, L			F, L			F, H, I, K		
Number of fuels				17			3			3			4			3		
	ASTM D396 requirements																	
Test	Method	Min.	Max.	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
Gravity ° API	D287	-	-	12.8	22.1	33.3	14.5	20.8	26.5	14.5	18.7	24.0	14.5	26.0	35.9	14.5	23.2	30.0
Flash point, Pensky-Martens closed tester ° F.	D93	130	-	160	-	230	154	-	225	156	-	240	200	-	240	160	-	240
Viscosity,																		
kinematic at 100° F. centistokes	D445	5.8	26.4	5.29	16.50	25.0	5.8	13.9	25	14.2	17.9	22.6	4.2	13.1	22.6	4.2	12.3	22.6
Cloud test ° F.	D97	-	-	10	-	34	-	6/ 20	-	-	-	-	-	6/ 10	-	-	6/ 10	-
Pour point do.	D97	-	20	<-45	-	20	-15	-	15	-40	-	0	-40	-	70	-40	-	0
Sulfur content wt. percent	D129	-	-	0.28	0.826	2.05	0.19	0.50	1.0	0.43	1.45	3.27	0.10	1.74	3.27	1.00	2.12	3.27
Aniline point ° F.	D611	-	-	117.2	(4)	178.7	-	6/ 163	-	-	-	-	-	6/ 142	-	-	6/ 142	-
Ramsbottom carbon residue																		
on 100 percent sample percent	D524	-	-	0.45	3.11	6.05	0.10	1.61	4.24	5.0	5.95	7.6	0.06	3.40	7.6	0.06	2.99	7.6
Corrosion, 3 hours at 122° F.	D130	-	-	-	-	1	-	-	6/ 5	-	-	-	3/ 0	-	-	3/ 0	-	-
Ash percent	D482	-	0.10	0.000	0.012	0.042	0.001	0.002	0.005	0.007	0.011	0.018	0.00	0.010	0.03	0.00	0.010	0.02
Water and sediment vol. percent	D96	-	0.50	0.00	0.15	0.44	-	Trace	-	0.2	0.30	0.7	0.0	0.05	0.1	0.0	0.03	0.10
Distillation test,																		
on volume recovered basis:																		
Initial boiling point ° F.		-	-	351	(4)	440	-	6/ 382	-	-	-	-	466	(4)	504	-	6/ 504	-
10 percent		-	-	447	-	544	-	500	-	-	-	-	498	-	534	-	534	-
50 percent		-	-	534	-	640	-	610	-	-	-	-	570	-	585	-	570	-
90 percent		-	-	716	-	748	-	700	-	-	-	-	630	-	744	-	630	-
End point		-	-	718	-	842	-	>760	-	-	-	-	696	-	>760	-	686	-

1/ Regions and districts are shown on map (fig. 1). 2/ Included is an analysis of one fuel produced and distributed in eastern Canada, north of districts A and C.
3/ Some of the fuels are sold in districts of more than one region. 4/ No averages were computed as an insufficient number of samples was represented.
5/ Viscosity in Furol seconds at 122° F. 6/ Result of test on one sample only.
7/ This summary of burner fuel oils of 1955 differs from that shown in IC 7730 in that several figures of some properties not meeting the requirements of fuels of that grade were omitted from the computations but are now included similar to the data for 1956.

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TABLE 4.--Summary of grade 5 fuels

Burner fuel oil survey, 1956

Geographic distribution of burner fuel oils 1/				Eastern region			Southern region			Central region			Rocky Mountain region			Western region		
Districts within region				A, B, C 2/			D			E, F, G			H, I, J, K 3/			L, M, N		
Additional districts 4/				D, E, G			A, B, C, G			C, D			-			H, I, K 3/		
Number of fuels				19			4			17			8			12		
Test	ASTM D396 requirements																	
	Method	Min.	Max.	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
Gravity ——— ——— ——— ——— ——— ° API	D287	-	-	8.4	16.4	23.6	14.6	16.6	18.6	5.5	14.7	24.8	0.0	12.3	21.4	10.5	14.2	20.5
Flash point, Pensky-Martens closed tester —° F.	D93	130	-	136	-	270	165	-	220	156	-	255	165	-	300	165	-	300
Viscosity																		
Kinematic at 100° F. ——— ——— centistokes	D445	32.1	-	25.5	75.1	135.7	42	71.6	133	15.15	78.8	133	13.5	97.3	179.1	13.5	(5)	167
Furol at 122° F. ——— ——— ——— ——— seconds	D88	-	40	11	25.6	39.8	18	25.2	36	11	23.3	36	12	26.6	39	12	28.5	38
Pour point ——— ——— ——— ——— ——— ——— —° F.	D97	-	-	-30	-	40	<-20	-	40	-25	-	45	-5	-	50	-25	-	50
Sulfur content——— ——— ——— ——— wt. percent	D129	-	-	0.42	1.08	2.4	0.59	1.57	2.68	0.54	1.38	3.52	0.65	2.33	4.7	0.65	1.50	4.7
Ramsbottom carbon residue																		
on 100 percent sample ——— ——— ——— percent	D524	-	-	2.9	5.64	9.1	3.9	6.03	7.95	3.9	6.66	11.2	1.75	6.71	14.4	1.75	8.05	14.3
Ash ——— ——— ——— ——— ——— ——— ——— ——— do.	D482	-	0.10	0.0	0.039	0.09	0.022	0.046	0.06	0.00	0.044	0.12	0.003	0.021	0.08	Trace	0.03	0.06
Water and sediment ——— ——— ——— vol. percent	D96	-	1.00	Trace	0.18	0.4	0.10	0.18	0.20	0.03	0.21	0.7	0.0	0.20	0.8	Trace	0.2	0.8

Burner fuel oil survey, 1955 6/

Geographic distribution of burner fuel oils 1/				Eastern region			Southern region			Central region			Rocky Mountain region			Western region		
Districts within region				A, B, C			D			E, F, G			H, I, J, K			L, M, N		
Additional districts 4/				D, E, G			A, B, C, G			C, D, H, I, K, L			E, F, G, L			F, H, I, K		
Number of fuels				13			4			19			9			14		
Test	ASTM D396 requirements																	
	Method	Min.	Max.	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
Gravity — — ——— ——— ——— ——— ——— ° API	D287	-	-	2.3	15.2	19.5	14.4	16.4	18.0	2.3	13.1	22.0	4.8	11.0	20.2	10.1	14.3	18.5
Flash point, Pensky-Martens closed tester — ° F.	D93	130	-	132	-	260	198	-	220	158	-	255	130	-	306	130	-	306
Viscosity																		
Kinematic at 100° F. ——— ——— centistokes	D445	32.1	-	36.4	73.2	116.5	38.38	71.6	130	14.16	67.6	130	47.32	(5)	162	77.7	(5)	162
Furol at 122° F. ——— ——— ——— ——— seconds	D88	-	40	15.6	24.6	40.0	15	24	35	11	24.4	38	18	30.1	40	22.5	32.5	40
Pour point ——— ——— ——— ——— ——— ——— —° F.	D97	-	-	-20	-	40	-15	-	40	-15	-	40	-15	-	60	-20	-	40
Sulfur content ——— — — — — wt. percent	D129	-	-	0.43	0.96	2.06	0.73	1.67	2.70	0.50	1.39	3.40	0.810	2.38	4.8	0.5	1.97	4.8
Ramsbottom carbon residue																		
on 100 percent sample ——— ——— ———percent	D524	-	-	2.69	5.98	10.13	3.8	5.55	8.64	3.8	7.43	11.8	0.61	5.57	10.2	3.80	8.34	14.4
Ash ——— ——— ——— ——— ——— ——— ——— ——— do.	D482	-	0.10	0.008	0.024	0.053	0.026	0.039	0.05	0.003	0.044	0.19	0.002	0.025	0.09	0.01	0.037	0.07
Water and sediment ——— ——— ——— vol. percent	D96	-	1.00	0.10	0.33	0.8	0.10	0.30	0.8	0.1	0.25	0.8	Trace	0.13	0.2	Trace	0.13	0.20

1/ Regions and districts are shown on map (fig. 1). 2/ Included are analyses of two fuels produced and distributed in eastern Canada, north of districts A and C.
3/ Included are analyses of two fuels produced and distributed in western Canada, north of districts H and L. 4/ Some of the fuels are sold in districts of more than one region.
5/ No average was computed as an insufficient number of samples was represented.
6/ This summary of burner fuel oils of 1955 differs from that shown in IC 7730 in that several figures of some properties not meeting the requirements of fuels of that grade were omitted from the computations but are now included similar to the data for 1956.

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TABLE 5.--Summary of grade 6 fuels

Burner fuel oil survey, 1956

Geographic distribution of burner fuel oils 1/				Eastern region			Southern region			Central region			Rocky Mountain region			Western region		
Districts within region				A, B, C 2/			D			E, F, G			H, I, J, K 3/			L, M, N		
Additional districts 4/				D, E			A, B, C, E, G, J			C, D, H, I, J			D, E, F, G, L			E, F, H, I, K 3/		
Number of fuels				46			14			32			23			23		
	ASTM D396 requirements																	
Test	Method	Min.	Max.	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
Gravity ——— ° API	D287	-	-	5.8	12.9	18.8	5.2	11.5	18.8	-3.3	9.7	17.7	0.0	9.2	21.4	4.9	9.7	16.8
Flash point, Pensky-Martens closed tester — ° F.	D93	150	-	140	-	285	>160	-	310	156	-	345	150	-	420	178	-	420
Viscosity																		
Furol at 122° F. ——— seconds	D88	45	300	28.2	148.5	258	36.5	155.2	278	28.2	190.7	291.5	36.5	148.1	285	45	147.0	245
Pour point ——— ° F.	D97	-	-	0	-	60	0	-	60	5	-	60	20	-	65	15	-	60
Sulfur content ——— wt. percent	D129	-	-	0.29	1.47	3.88	0.58	1.50	2.85	0.55	1.37	3.7	0.55	1.92	5.25	0.70	1.70	5.25
Ramsbottom carbon residue																		
on 100 percent sample ——— percent	D524	-	-	1.67	9.36	15.7	4.9	10.49	15.0	1.67	10.72	20.6	4.39	10.64	22.7	5.8	13.76	18.2
Ash ——— do.	D482	-	-	0.0	0.053	0.28	0.005	0.045	0.09	0.008	0.068	0.5	Trace	0.031	0.2	Trace	0.05	0.08
Water and sediment ——— vol. percent	D96	-	2.00	0.05	0.27	1.5	0.05	0.28	1.0	<0.1	0.18	1.0	0.0	0.36	1.6	<0.1	0.2	0.8

Burner fuel oil survey, 1955 5/

Geographic distribution of burner fuel oils 1/				Eastern region			Southern region			Central region			Rocky Mountain region			Western region		
Districts within region				A, B, C			D			E, F, G			H, I, J, K			L, M, N		
Additional districts 4/				D, E, G, J			A, B, C, E, G, J			C, D, H, K, L			A, B, D, E, F, L			F, H, I, K		
Number of fuels				35			14			28			17			24		
	ASTM D396 requirements																	
Test	Method	Min.	Max.	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum
Gravity ——— ° API	D287	-	-	3.6	11.8	17.5	6.2	10.6	13.9	-1.1	10.3	23.2	4.5	10.0	20.2	7.8	9.9	15.6
Flash point, Pensky-Martens closed tester —° F.	D93	150	-	154	-	290	152	-	230	160	-	430	150	-	420	150	-	420
Viscosity																		
Furol at 122° F. ——— seconds	D88	45	300	64	169.9	290	70	165.3	240	44	189.9	295	35.5	159.9	276.1	70	148.9	236
Pour point ——— ° F.	D97	-	-	10	-	80	10	-	80	20	-	80	20	-	60	5	-	60
Sulfur content ——— wt. percent	D129	-	-	0.56	1.44	3.63	0.45	1.55	2.86	0.60	1.38	3.46	0.40	2.14	5.25	0.5	1.97	5.25
Ramsbottom carbon residue																		
on 100 percent sample ——— percent	D524	-	-	2.78	10.19	22.65	4.5	10.86	22.65	1.30	12.41	20.9	0.61	10.40	21.20	3.75	12.91	18.1
Ash ——— do.	D482	-	-	0.0	0.044	0.15	0.010	0.076	0.15	0.014	0.150	1.9	0.006	0.055	0.4	0.01	0.051	0.11
Water and sediment ——— vol. percent	D96	-	2.00	0.04	0.29	0.75	0.05	0.283	0.60	0.1	0.32	0.8	Trace	0.42	1.8	0.03	0.20	0.9

1/ Regions and districts are shown on map (fig. 1). 2/ Included are analyses of three fuels produced and distributed in eastern Canada, north of districts A and C.
3/ Included are analyses of three fuels produced and distributed in western Canada, north of districts H and L. 4/ Some of the fuels are sold in districts of more than one region.
5/ This summary of burner fuel oils of 1955 differs from that shown in IC 7730 in that several figures of some properties not meeting the requirements of fuels of that grade were omitted from the computations but are now included similar to the data for 1956.

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The regions and districts are indicated in figure 1. These areas were established by a study committee of the API and are based on fuel-distribution systems, refinery locations, centers of population, temperature zones, and arteries of commerce, such as navigable waters. The districts are the same as now used for the diesel-fuel surveys but are different from those of the motor-gasoline surveys. 5/

The data in tables 6 through 10 are arranged, within each grade group, according to the regions where the fuels are sold. In each regional tabulation the districts where each fuel is sold are given in the second column. The listing of the districts indicates in decreasing order the relative volume of sales for each fuel. Thus, the first district listed is that in which the greatest volume of a fuel is sold, and the analysis of this fuel is tabulated in the first section of data under the region containing that district. The second section of data, separated by a line from the first section, contains analyses of fuels that are sold in greatest volume in districts of other regions. The first section of data in each regional tabulation might be considered to represent fuels of major distribution and the second section to represent fuels of minor distribution for that particular region. It is possible that the sales volume of a given fuel may be highest in a district of one region but that the total sales in districts of another region may be greater. Consider, for example, a fuel distributed in districts C, E, and F. The greatest sales volume might be in district C of the Eastern region, but the combined sales in districts E and F of the Central region could be higher. This fuel would be listed as a fuel of major distribution in the Eastern region and as a fuel of minor distribution in the Central region. It is believed, however, that in most cases the region of greatest sales volume will contain the district of greatest sales volume.

The first column of these tables shows item numbers of the analyses, each of which represents one sample of burner-fuel oil. The same item number in different tables indicates that this fuel is sold in more than one region, and the analytical data are repeated.

The column headings for the data show the primary ASTM designations of the test procedures. If a test was made by another procedure, the exception is indicated with a footnote. Viscosities of grades 1, 2, 4, and 5 burner-fuel oils were determined in centistokes at 100° F. Viscosities of grades 5 and 6 fuels were determined in Saybolt Furol seconds at 122° F.

5/ Blade, O. C., National Motor Gasoline Survey, Summer 1955: Bureau of Mines Inf. Circ. 7746, 1956, 24 pp. (In cooperation with the American Petroleum Institute).

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Occasionally a certain property of a fuel is not within the limits of the requirement of its grade. 6/ That figure is noted but is included in the average and minimum or maximum. Most such exceptions are viscosity and sulfur content. Some of the properties were determined to the nearest whole unit, and the figures therefore have no decimal. Detailed data for ash are omitted from tables 6 and 7 as this test was not required for grades 1 and 2 fuels. However, as figures for this property were included in some of the analyses (less than one-half) the summaries of the results are shown in tables 1 and 2. Distillation data are shown by ASTM Method D86 for grade 1 burner-fuel oils and by ASTM D158 for grade 2 fuels, and for grade 4 fuels where given.

Average values of seven or less selected characteristics of all the burner-fuel oils indicated in each of tables 6 through 10 have been computed where possible and are shown at the bottoms of the respective tables. Averages for flash point, cloud test, pour point, and corrosion are not given. Minimum and maximum figures are shown for all the properties.

Summaries of the results of this survey, compared with similar results of the 1955 survey, are shown in tables 1, 2, 3, 4, and 5 which include figures indicating the ASTM limits of the requirements of grades 1, 2, 4, 5, and 6 fuel oils, respectively.

6/ American Society for Testing Materials, Tentative Specifications for Fuel Oils (D396-48T): ASTM Standards on Petroleum Products and Lubricants, Philadelphia 1955, pp. 184-86.

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TABLE 6.--Analyses of grade 1 burner fuel oils, 1956

Eastern region: Districts A, B, and C

Item	Distributed in districts 1/	Gravity ASTM D287 °API	Flash point ASTM D56 °F.	Viscosity, kinematic at 100° F. ASTM D445 Cs.	Cloud test ASTM D97 °F.	Pour point ASTM D97 °F.	Sulfur content ASTM D129 Wt. pct.	Aniline point ASTM D611 °F.	Carbon residue, Ramsbottom 2/ ASTM D524 On 10 percent Resid., percent	Corrosion ASTM D130 3 hours at 122° F.	Water and sediment ASTM D96 Vol. pct.	Distillation 3/ ASTM D86 Temperature, °F. % recovered IBP	10	50	90	End point
1	A, B, D	43.5	128	1.52	-54	-60	0.04	147.6	0.08	<1A	<0.1	340	370	413	475	515
2	A, B, D	40.6	138	-	-	-	.072	-	-	3	-	344	386	437	495	530
3	B	44.0	136	1.67	-34	-35	.05	153.0	.06	1	.0	360	385	436	499	537
4	B	45.2	140	1.55	-38	-40	.07	153.0	.06	1	.0	354	380	421	486	530
5	B, A, C	43.2	120	1.51	<-50	<-50	.03	145.0	.02	1	.0	322	364	412	474	532
6	B, A, D	41.2	141	1.76	<-25	<-25	.045	-	.05	1	.0	363	390	43[illegible]	500	540
7	B, C	43.2	124	1.7	-10	-20	.05	144	.07	1	.0	336	367	416	488	528
8	B, D, A	43.2	130	1.7	-30	-40	.05	145	.06	1	.0	341	381	423	482	534
9	B, D, E	42.3	135	1.68	-30	-40	.015	150.0	.08	1	-	340	379	432	495	529
10	C	46.9	140	1.5	-30	-40	.05	157	.02	1A	.0	353	375	420	492	538
11	C	43.8	144	4/2.27	-8	-10	.08	159	-	1	.0	362	416	477	567	619
12	C	46.5	140	1.65	<-40	<-40	.046	159.5	.05	1	.00	353	381	418	488	529
13	C	47.0	146	1.90	-16	-20	.15	155	-	1	.0	379	392	416	451	468
14	C	46.7	154	1.90	-10	-20	.15	155	-	1	.0	380	401	424	465	506
15	C	42.9	5/135	-	-	-20	.075	147.2	.10	1	.0	346	375	419	479	524
16	C	46.2	5/131	1.45	-	-20	.038	153	.09	1	.0	348	374	414	484	526
17	C	42.5	5/135	1.77	-20	-20	.11	-	.09	1	.0	342	379	425	486	522
18	C	43.2	5/134	-	-	0	.073	-	.10	1	Trace	350	377	414	473	512
19	C	44.7	130	1.6	-30	-40	.10	150	.05	1	.0	334	368	402	460	510
20	C	48.3	135	1.56	-32	-50	.054	163.2	.00	1A	-	336	371	408	476	550
21	C, B, A	43.8	126	1.5	-40	-55	.08	147	<.1	1A	.0	330	359	408	475	526
22	C, E	42.2	127	1.57	-40	-45	.12	144	.06	1A	.00	350	380	422	490	530
23	C, E	43.6	134	1.60	-48	-50	.07	149.1	.06	1	.0	347	380	430	491	536
24	C, E, A	40.4	146	1.65	-48	-50	.07	157.1	.05	1	.0	366	400	437	486	516
25	C, E, A	42.5	136	1.62	-48	-50	.09	146.3	.06	1	.0	365	391	429	480	505
26	C, E, D	42.1	126	1.75	<-15	<-15	.14	146.5	.09	1A	.0	364	384	426	494	550
27	Eastern Canada 6/	41.6	5/151	1.77	-40	<-40	.11	138.2	.06	1A	.0	358	390	433	505	549
28	Do. 6/	39.0	134	1.65	-44	-55	.12	135.5	.01	1	.0	320	375	437	506	555
29	Do. 6/	40.2	148	1.9	<-45	<-45	.210	143	.09	1	.0	364	408	440	483	524
30	D, B, A	42.1	132	1.56	-50	-50	.023	-	.01	1	-	338	376	423	473	508
31	D, B, A, C	42.7	130	-	-	-	.08	-	-	<1	.00	330	372	445	520	543
32	D, B, A, C, G	36.3	5/174	4/2.43	-16	-25	.30	144.0	.05	1	Trace	370	4/428	486	554	602
33	D, B, A, G	43.4	136	1.66	-34	-35	.06	151.5	.02	1	0	358	382	432	500	536
38	E, C	41.7	148	2.1	-36	-35	.10	155.3	.0	1	.0	365	396	448	523	565
39	E, C	40.9	142	1.87	<-40	<-40	.077	150.8	.12	1	<.1	368	400	444	496	526
40	E, C	43.9	123	1.60	-48	-40	.114	149.0	.06	1A	.01	336	370	420	497	558
41	E, C	42.7	140	1.7	-	-	.11	154	.15	1A	-	340	375	431	508	546
42	E, C	41.2	5/160	2.0	-10	-35	.070	148	.06	1B	.0	373	401	445	514	556
43	E, C, D	43.0	136	1.8	-30	-40	.060	140	.06	1A	.0	358	382	414	466	504
44	E, C, G	42.1	137	1.75	<-20	<-20	.09	146	.08	1	-	364	386	438	504	531
45	E, C, G	42.4	5/138	1.71	-15	-30	.09	151.0	.07	1	.0	344	374	430	520	564
Average (41 samples)		43.0	-	1.73	-	-	0.086	149.5	0.062	-	0.00	351	383	429	493	534
Minimum		36.3	120	1.45	-54	-60	0.015	135.5	0.00	<1A	0.00	320	359	402	451	468
Maximum		48.3	154	2.43	-8	0	.30	163.2	.15	3	<.1	380	428	486	567	619

1/ District letters refer to the areas in which the fuels are sold (see fig. 1). In each item the arrangement of district letters indicates in decreasing order the relative volumes of the fuel. Fuels listed above the lines separating items 29 and 30 are generally sold in greatest volumes in the Eastern region. The fuels listed below the lines are generally sold in lesser volumes in that region than in some other regions.

2/ Some of the determinations were made by the Conradson method, ASTM D189-52, and the data were converted to Ramsbottom values using table 1 and figure 4 in the appendix of the Conradson method.

3/ Distillation figures have been converted, where necessary, to temperatures at 760 mm. Hg according to table 1 in ASTM D86-52. 4/ Does not meet the requirement of fuels of this grade.

5/ Flash point by Pensky-Martens closed tester, ASTM D93-52. 6/ Produced and distributed in eastern Canada, north of districts A and C.

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TABLE 6.--Analyses of grade 1 burner fuel oils, 1956 (Cont.)

Item	Distributed in districts 1/	Gravity ASTM D297 °API	Flash point ASTM D93 °F.	kinematic at 100° F. ASTM D445 Cs.	Cloud test ASTM D97 °F.	Pour point ASTM D97 °F.	Sulfur content ASTM D129 Wt. pct.	Aniline point ASTM D611 °F.	Carbon residue Ramsbottom 2/ ASTM D524 On 10 percent Resid., percent	Corrosion ASTM D130 3 hours at 122° F.	Water and sediment ASTM D96 Vol. pct.	Distillation 3/ ASTM D158 Temperature, °F. Pct. recovered IBP	10	50	90	End point
Southern region: District D																
30	D, B, A	42.1	132	1.56	-50	-50	0.023	-	0.01	1	-	338	376	423	473	508
31	D, B, A, C	42.7	130	-	-	-	.08	-	-	<1	0.00	330	372	445	520	543
32	D, B, A, C, G	36.3	4/174	5/2.43	-16	-25	.30	144.0	.05	1	Trace	370	5/428	486	554	602
33	D, B, A, G	43.4	136	1.66	-34	-35	.06	151.5	.02	1	.0	358	382	432	500	536
1	A, B, D	43.5	128	1.52	-54	-60	.04	147.6	.08	<1A	<.1	340	370	413	475	515
2	A, B, D	40.6	138	-	-	-	.072	-	-	3	-	344	386	437	495	530
6	B, A, D	41.2	141	1.76	<-25	<-25	.045	-	.05	1	.00	363	390	439	500	540
8	B, D, A	43.2	130	1.7	-30	-40	.05	145	.06	1	.0	341	381	423	482	534
9	B, D, E	42.3	135	1.68	-30	-40	.015	150.0	.08	1	-	340	379	432	495	529
26	C, E, D	42.1	126	1.75	<-15	<-15	.14	146.5	.09	1A	.0	364	384	426	494	550
43	E, C, D	43.0	136	1.8	-30	-40	.060	140	.06	1A	.0	358	382	414	466	504
52	F, E, G, D	42.6	131	1.8	-15	-30	.15	154	-	1	.00	320	370	444	522	557
58	G, D, E	44.5	128	1.9	-25	-35	.09	153	.04	1	.0	336	362	418	492	520
Average (13 samples)		42.1	-	1.78	-	-	0.087	148.0	0.054	-	0.00	346	382	433	498	536
Minimum		36.3	126	1.52	-54	-60	0.015	140	0.01	<1A	0.00	320	362	413	466	504
Maximum		44.5	141	2.43	<-15	<-15	.30	154	.09	3	<.1	370	428	486	554	602
Central region: Districts E, F, and G																
34	E	43.2	4/140	1.9	-	-30	0.11	155	0.09	1A	0.0	346	379	435	513	556
35	E	44.6	4/138	1.72	-10	<-10	.28	161.2	.06	1	.0	340	370	434	512	568
36	E	42.2	132	1.6	-20	-25	5/.574	-	.036	1	.0	320	360	430	540	580
37	E	41.8	134	-	-	-	.282	-	-	1	.0	344	384	434	514	556
38	E, C	41.7	148	2.1	-36	-35	.10	155.3	.0	1	.0	365	396	448	523	565
39	E, C	40.9	142	1.87	<-40	<-40	.077	150.8	.12	1	<.1	368	400	444	496	526
40	E, C	43.9	123	1.60	-48	-40	.114	149.0	.06	1A	.01	336	370	420	497	558
41	E, C	42.7	140	1.7	-	-	.11	154	.15	1A	-	340	375	431	508	546
42	E, C	41.2	4/160	2.0	-10	-35	.070	148	.06	1B	.0	373	401	445	514	556
43	E, C, D	43.0	136	1.8	-30	-40	.060	140	.06	1A	.0	358	382	414	466	504
44	E, C, G	42.1	137	1.75	<-20	<-20	.09	146	.08	1	-	364	386	438	504	531
45	E, C, G	42.4	4/138	1.71	-15	-30	.09	151.0	.07	1	.0	344	374	430	520	564
46	E, F, G	42.2	4/164	1.97	<-25	<-25	.038	152.8	.0	1	.0	382	405	457	518	556
47	E, F, G	42.5	132	1.84	-30	-35	.07	154	.06	1	.00	350	380	440	546	562
48	E, G	43.6	128	1.63	-38	-40	.071	151.5	.082	1A	.00	338	370	423	492	544
49	E, G	42.9	133	1.6	-	-	.14	151	.06	1A	Trace	342	372	433	523	565
50	E, G, F	44.0	142	1.61	-50	-60	6/.06	152.2	.06	1	.00	364	385	414	453	496
51	E, G, F	40.9	143	2.04	-25	-35	6/.12	152.9	.06	1	.00	358	405	459	534	579
52	F, E, G, D	42.6	131	1.8	-15	-30	.15	154	-	1	.0	320	370	444	522	557
53	G	42.1	1.42	-	-25	-30	.036	156.1	.053	1	.000	362	394	454	534	570
54	G	42.7	132	1.65	-20	-40	.200	147	-	1	.00	344	386	438	490	540
55	G	43.0	139	1.8	<-25	<-25	.167	152.0	-	1A	.0	372	388	440	503	542
56	G	43.1	135	-	-	-45	.05	151	.08	1A	.0	-	378	425	488	534
57	G	41.9	146	1.79	-40	-45	.04	151	.08	1	.0	340	396	446	480	521
58	G, D, E	44.5	128	1.9	-25	-35	.09	153	.04	1	.0	336	362	418	492	520
59	G, E, F	42.1	140	1.9	-28	-30	.05	154.4	.06	1A	.0	352	394	446	530	567
60	G, E, F	41.4	140	2.15	-20	-30	6/.112	154.0	.046	1	.00	347	404	461	519	550
61	G, F	42.1	152	1.85	-40	-40	.049	152.6	.034	1	.0	376	402	441	510	556
62	G, F	41.5	146	2.20	-20	-30	.15	154	.10	1	.0	375	414	452	525	561
63	G, F, E	41.7	154	1.86	-32	-40	.098	152	.062	1	.0	376	397	440	498	538

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64	G, F, E	44.1	137	1.58	-40	-45	.084	151.5	.07	1	.0	350	372	418	474	518
65	G, F, E	44.0	134	1.73	-22	-25	.074	154.5	.07	1	.0	353	385	439	510	550
66	G, F, E	43.6	131	1.60	-42	-45	.043	151	.09	1	.0	344	375	426	490	520
67	G, F, E	42.6	138	1.93	-30	-35	.048	152	.07	1	.0	338	392	455	533	565
68	G, F, I	41.8	137	2	-25	-40	.12	157	.06	1	.0	360	405	452	514	560
69	G, J	38.6	158	2.0	-15	-30	.38	141	.104	1	.0	360	422	459	509	541
9	B, D, E	42.3	135	1.68	-30	-40	.015	150.0	.08	1	-	340	379	432	495	529
22	C, E	42.2	127	1.57	-40	-45	.12	144	.06	1A	.00	350	380	422	490	530
23	C, E	43.6	134	1.60	-48	-50	.07	149.1	.06	1	.0	347	380	430	491	536
24	C, E, A	40.4	146	1.65	-48	-50	.07	157.1	.05	1	.0	366	400	437	486	516
25	C, E, A	42.5	136	1.62	-48	-50	.09	146.3	.06	1	.0	365	391	429	480	505
26	C, E, D	42.1	126	1.75	<-15	< -15	.14	146.5	.09	1A	.0	364	384	426	494	550
32	D, B, A, C, G	36.3	4/174	5/2.43	-16	-25	.30	144.0	.05	1	Trace	370	5/428	486	554	602
33	D, B, A, G	43.4	136	1.66	-34	-35	.06	151.5	.02	1	.0	358	382	432	500	536
82	I, G, F, H	40.0	130	5/2.35	-15	-20	.10	153	<.10	1A	.0	348	409	481	552	597
86	J, I, E	43.1	149	1.76	<-25	< -25	.011	151.6	.0	1	.0	367	396	439	490	522
Average (46 samples)		42.3	-	1.82	-	-	0.117	151.3	0.064	-	0.000	354	388	439	507	547
Minimum		36.3	123	1.57	-50	-60	0.011	140	0.0	1A	0.000	320	360	414	453	496
Maximum		44.6	158	2.43	-10	< -10	.574	161.2	.15	1	<.1	382	428	486	554	602
Rocky Mountain region: Districts H, I, J, and K																
70	H	43.9	131	1.44	< -30	< -30	6/ 0.079	141	0.06	1	Trace	344	366	407	468	513
71	H	42.3	140	1.66	< -30	< -30	6/ .164	144	.06	1	do	345	386	434	512	563
72	H	39.8	145	2.0	-20	-35	.440	151	.002	1	0.0	360	417	471	512	552
73	H	43.2	148	1.53	-54	-55	6/ .03	142.2	.05	1A	<.1	370	381	410	464	522
74	H, L	41.5	131	1.70	-35	-45	.25	147	.08	1	.00	356	383	422	490	524
75	H, L, K, I	39.2	140	1.6	-40	-55	5/ .96	137	.06	1	.0	362	405	448	500	534
76	I	42.6	129	1.58	< -20	< -20	.03	148.0	.06	1	Trace	346	387	429	489	524
77	I	42.2	156	1.77	-30	-30	6/ .048	152.6	.020	1	.00	369	409	447	513	529
78	I	42.2	138	1.85	-38	-45	.03	150	.05	1	.00	360	389	439	507	552
79	I	44.9	4/124	1.52	< -20	< -25	.21	146	.035	1	.0	344	362	393	469	550
80	I	41.6	135	-	-	-	.39	149	.00	1A	-	345	378	426	511	547
81	I	40.8	155	1.75	-60	-	.353	147.0	.08	1A	.0	382	411	439	490	528
82	I, G, F, H	40.0	130	5/2.35	-15	-20	.10	153	<.10	1A	.0	348	409	481	552	597
83	J	43.8	135	1.63	-48	-45	6/ .090	150.1	.08	1A	.0	355	391	424	470	502
84	J	41.6	157	1.72	-45	-50	.26	144	.08	1	.00	369	395	430	477	507
85	J	41.8	131	1.51	-20	-50	.084	141.6	.08	1	.0	350	379	420	474	536
86	J, I, E	43.1	149	1.76	<-25	< -25	.011	151.6	.0	1	.0	367	396	439	490	522
87	K, L	41.6	4/138	1.90	-24	-40	.24	152.4	.06	1A	.00	332	389	451	534	585
88	K, L, M, N	41.8	134	2.22	-40	-45	.18	151	.05	1	.0	330	391	438	502	560
89	Western Canada 7/	40.6	136	1.91	-26	-25	.11	146	.03	1A	-	351	380	446	543	620
90	Do 7/	41.7	128	1.66	-42	-40	.10	144	.02	1A	-	341	380	428	505	600
91	Do 7/	42.1	126	1.67	-34	-40	.203	141	.08	1A	.0	326	362	419	514	563
92	Do 7/	41.2	143	2.02	-20	-25	.280	143	.10	1A	.0	331	369	435	536	596
93	Do 7/	44.5	4/140	1.38	< -30	< -30	.08	140	.09	1A	.0	344	367	395	440	474
68	G, F, I	41.8	137	2	-25	-40	.12	157	.06	1	.0	360	405	452	514	560
69	G, J	38.6	158	2.0	-15	-30	.38	141	.104	1	.0	380	5/422	459	509	541
Average (26 samples)		41.9	-	1.77	-	-	0.20	146.6	0.057	-	0.00	353	389	434	499	546
Minimum		38.6	126	1.38	-60	-55	0.011	137	0.00	1A	0.00	326	362	393	440	474
Maximum		44.9	158	2.35	-15	-20	.96	157	.104	1	<.1	382	422	481	552	620

1/ District letters refer to the areas in which the fuels are sold (see fig. 1). In each item the arrangement of district letters indicates in decreasing order the relative volumes of the fuel. Fuels listed above the lines separating items 33 and 1 in the Southern region, items 69 and 9 in the Central region, and items 93 and 68 in the Rocky Mountain region are generally sold in greatest volumes in those respective regions. The fuels listed below the lines are generally sold in lesser volumes in the respective regions than in some other regions.

2/ Some of the determinations were made by the Conradson method, ASTM D189-52, and the data were converted to Ramsbottom values using table 1 and figure 4 in the appendix of the Conradson method.

3/ Distillation figures have been converted, where necessary, to temperatures at 760 mm. Hg according to table 1 in ASTM D86-52. 4/ Flash point by Pensky-Martens closed tester, ASTM D93-52.

5/ Does not meet the requirement of fuels of this grade. 6/ Determined by lamp method, ASTM D90 or D1266. 7/ Produced and distributed in western Canada, north of districts H and L.

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TABLE 6.--Analyses of grade 1 burner fuel oils, 1956 (Cont.)

Western region: Districts L, M, and N

Item	Distributed in districts 1/	Gravity ASTM D287 °API	Flash point ASTM D56 °F.	Viscosity, kinematic at 100° F. ASTM D445 Cs.	Cloud test ASTM D97 °F.	Pour point ASTM D97 °F.	Sulfur content ASTM D129 Wt. pct.	Aniline point ASTM D611 °F.	Carbon residue Ramsbottom 2/ ASTM D524 On 10 percent Resid., percent	Corrosion ASTM D130 3 hours at 122° F.	Water and sediment ASTM D96 Vol. pct.	Distillation 3/ ASTM D86 Temperature, °F. Pct. recovered IBP	10	50	90	End point
94	L	40.6	4/130	1.83	<-20	<-20	0.40	-	0.08	-	Trace	312	390	444	503	546
95	L, M	34.9	4/140	2.02	<-20	-30	.14	-	.08	-	do	340	392	450	510	564
96	L, M	35.5	4/160	2.19	-48	<-40	.20	131.4	.08	2	0.00	356	414	468	536	578
97	L, M, N	42.7	135	1.59	-58	-55	.01	156.3	.03	1	.0	370	391	427	470	500
98	L, M, N	37.8	140	1.90	-32	-45	.14	135.1	.05	1	.0	360	398	445	508	548
99	L, M, N	37.9	4/150	1.8	-60	-65	.19	135	.08	1A	.0	344	382	429	496	536
100	L, N	38.0	4/144	1.83	< -20	<-20	.40	-	.13	1	-	358	402	446	501	554
101	L, N	36.0	4/158	1.99	-50	<-40	.57	130.0	.06	2	.00	374	402	449	522	572
102	M, L	42.7	132	1.78	-56	-55	5/ <.01	159.1	.03	1A	< .1	350	388	428	469	506
103	M, L	37.6	128	1.89	-36	-40	5/ .16	136.0	.03	1A	< .1	330	390	442	520	558
104	M, N	34.8	143	2.11	-46	-50	.44	130.8	.12	1	.0	350	398	456	540	580
105	M, N, L	40.0	120	1.86	-40	0	.21	142	.06	1	.0	330	403	438	478	526
106	N	36.7	153	2.18	-24	-25	5/ .12	140	.08	1A	< .1	370	414	471	530	580
107	N	42.7	133	1.79	-50	-50	5/ .03	159.4	.03	1A	< .1	352	387	428	467	508
108	N	36.8	127	2.12	-38	-40	5/ .49	138.5	.07	1A	< .1	327	403	461	524	564
109	N	36.5	185	2.2	-25	-40	.03	140	.09	1	.00	380	420	465	525	560
110	N, M	37.1	4/126	1.50	-50	<-40	.18	121.0	.08	2	.00	342	370	409	460	491
74	H, L	41.5	131	1.70	-35	-45	.25	147	.08	1	.00	356	383	422	490	524
75	H, L, K, I	39.2	140	1.6	-40	-55	6/ .96	137	.06	1	.0	362	405	448	500	534
87	K, L	41.6	4/138	1.90	-24	-40	.24	152.4	.06	1A	.00	332	389	451	534	585
88	K, L, M, N	41.8	134	2.22	-40	-45	.18	151	.05	1	.0	330	391	438	502	560
89	Western Canada 7/	40.6	136	1.91	-26	-25	.11	146	.03	1A	-	351	380	446	543	620
90	Do 7/	41.7	128	1.66	-42	-40	.10	144	.02	1A	-	341	380	428	505	600
91	Do 7/	42.1	126	1.67	-34	-40	.203	141	.08	1A	.0	326	362	419	514	563
92	Do 7/	41.2	143	2.02	-20	-25	.280	143	.10	1A	.0	331	369	435	536	596
93	Do 7/	44.5	4/140	1.38	<-30	<-30	.08	140	.09	1A	.0	344	367	395	440	474
Average (26 samples)		39.3	-	1.87	-	-	0.236	141.6	0.067	-	0.00	347	391	440	505	551
Minimum		34.8	120	1.50	-60	-65	< 0.01	121.0	0.02	1A	0.00	312	362	395	440	474
Maximum		44.5	185	2.22	-20	0	.96	159.4	.13	2	< .1	380	420	471	543	620

TABLE 7.--Analyses of grade 2 burner fuel oils, 1956

Eastern region: Districts A, B, and C

Item	Distributed in districts 1/	Gravity ASTM D287 °API	Flash point ASTM D93 °F.	Viscosity, kinematic at 100° F. ASTM D445 Cs.	Cloud test ASTM D97 °F.	Pour point ASTM D97 °F.	Sulfur content ASTM D129 Wt. pct.	Aniline point ASTM D611 °F.	Carbon residue, ASTM D524 On 10 percent Resid., pct.	Corrosion ASTM D130 3 hours at 122° F.	Water and sediment ASTM D96 Vol. pct.	Distillation 3/ ASTM D158 Temperature, °F. Pct. recovered IBP	10	50	90	End point
111	A, B, C, D	33.2	158	2.7	-	0	0.54	134	0.13	1A	-	350	418	508	596	648
112	A, B	32.6	168	2.53	0	-15	.25	131.9	.20	1A	< 0.1	364	430	500	568	616
113	B	33.6	150	-	-	-10	.47	134	.20	1A	Trace	336	431	505	581	636
114	B, A	35.8	168	2.49	2	0	.08	141.6	.08	1	.0	368	434	492	554	616
115	B, A	31.6	150	2.91	-5	-30	.16	-	.11	1	.0	350	418	500	584	654
116	B, A	33.2	158	2.42	4	0	.60	132.6	.17	1A	.0	347	411	506	596	644
117	B, A	36.5	150	2.87	-4	-10	.64	148.3	.13	1	Trace	350	419	503	599	645
118	B, A, C	36.7	155	2.71	-4	-10	.47	148.9	.13	1	do	353	434	502	588	632
119	B, A, C	36.4	164	2.54	-8	-5	.59	145.4	.108	1	-	368	438	498	580	644
120	B, A, C	33.8	146	2.64	8	0	.25	140.7	.24	1	Trace	340	432	510	590	665

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121	B, A, C	33.8	144	2.7	-	0	.20	142	.29	1	< .01	356	434	524	588	646
122	B, A, C, D	33.0	140	-	-	0	.45	-	.16	1	.00	320	420	506	588	640
123	B, A, D	31.9	152	-	-	-	.53	-	-	8/ 3	-	316	438	503	600	638
124	B, A, D	35.3	164	2.45	0	-5	.64	-	.18	1	.0	361	430	497	570	627
125	B, A, D, C, G, E	32.2	152	2.55	0	-10	.52	127.5	.19	1	Trace	338	432	510	594	634
126	B, C	33.4	9/158	-	-	-10	.43	134	.13	1A	do	350	428	500	577	627
127	B, C	35.6	144	2.4	5	-5	.45	135	.12	1	.0	322	406	494	576	634
128	B, C	28.5	160	3.35	-	10	6/1.02	-	10/.080	1	.00	388	446	540	620	673
129	B, C, A	36.9	160	2.86	8	-5	.35	155	.075	1	.00	358	435	525	582	666
130	B, C, A	36.7	152	2.81	10	0	.28	145	.089	1	.00	345	405	505	595	670
131	B, D	34.3	154	2.38	6	-5	.19	133	.24	1	.01	360	432	480	580	648
132	B, D, A	34.3	146	2.4	0	-10	.53	130	.15	1	.0	328	406	499	586	638
133	B, D, E	34.9	162	2.58	6	0	.066	143.5	.20	1	-	369	422	505	589	663
134	C	39.6	158	2.51	2	0	.11	161	.06	1	.0	372	414	490	592	641
135	C	34.2	144	2.4	-	-5	.26	135	.15	1A	Trace	335	408	500	578	630
136	C	43.1	178	2.5	6	-5	.07	169	.03	1A	.0	386	428	491	588	639
137	C	40.8	205	3.2	30	20	.08	176	.04	1A	.0	440	480	530	635	675
138	C	39.9	180	2.92	10	5	.11	170	-	1	.0	369	441	521	609	638
139	C	39.7	155	2.70	2	-5	.15	164	.06	1	.00	363	443	498	574	618
140	C	36.9	9/198	3.15	22	15	.15	172	-	1	.0	443	487	525	588	624
141	C	42.9	9/158	2.24	10	-5	.15	165	-	1	.0	383	420	459	552	622
142	C	32.2	158	2.8	-	0	.37	129.2	.13	-	.0	341	437	511	581	635
143	C	39.8	136	2.60	-	0	.33	162	.09	-	.0	356	420	516	602	652
144	C	33.5	154	2.8	10	0	.21	-	.30	1	.0	348	429	506	583	635
145	C	35.6	175	2.8	-	0	.28	-	.19	1	Trace	373	434	516	580	616
146	C	39.7	194	3.5	0	-5	.25	165	.08	1	.0	396	460	508	558	604
147	C	44.3	157	2.54	8	0	.052	175.8	.01	1A	-	364	405	480	614	663
148	C, B, A	35.6	134	2.3	12	0	.23	141.1	< .17	1A	.0	328	393	508	604	656
149	C, E	37.5	175	3.31	10	0	.28	158.5	.07	1B	.00	376	454	536	600	632
150	C, E	40.1	163	2.39	-8	-20	.11	158.1	.09	1	Trace	367	426	489	562	624
151	C, E	28.9	200	3.33	14	-10	.35	125.3	.23	1	do	429	483	543	608	646
152	C, E, A	36.2	155	2.38	-12	-15	.18	141.4	.17	1	do	359	429	495	560	600
153	C, E, A	28.3	215	3.02	14	-5	.33	114.5	.21	1	.0	428	481	524	578	609
154	C, E, D	30.7	222	3.25	-6	< -10	.16	128.0	.14	1A	.0	450	480	522	580	634
155	Eastern Canada 11/	33.2	164	2.30	-10	-20	.35	154.4	.13	1	.0	366	427	489	560	614
156	Do 11/	28.7	156	2.33	-10	-15	.50	100.0	.01	1	.0	352	432	496	568	608
157	Do 11/	29.6	183	2.8	0	-5	.408	120	.22	1	.0	388	458	518	595	640
160	D, B, A	32.0	160	2.74	< 0	-5	.19	-	.12	1	.01	335	436	522	583	621
161	D, B, C	32.9	170	3.1	10	0	.09	140	.06	1A	.0	366	450	508	580	652
162	D, E, C	30.7	166	2.1	0	-10	.4	120	.1	-	.0	366	438	504	598	642
168	E, C	34.5	160	3.0	-8	-5	.45	130	.12	1	.0	360	410	500	567	600
169	E, C	27.4	174	2.88	0	0	.281	111.2	.14	1	< .1	400	481	521	578	618
170	E, C	36.4	155	2.19	-2	-15	.737	136.4	.09	1A	.01	350	389	470	569	632
171	E, C	33.2	148	2.4	-	0	.35	135	.20	1A	-	318	415	500	576	623
172	E, C	36.5	160	2.36	-5	-10	.108	143	.08	1B	.0	360	420	486	570	632
173	E, C, G	33.9	176	2.39	< 0	-5	.79	132	.22	1	Trace	392	436	499	580	641
174	E, C, G	37.5	150	2.53	15	0	.21	150.8	.09	1	.0	335	406	516	608	650
Average (57 samples)		34.9	-	2.68	-	-	0.330	142.6	0.137	-	0.00	364	432	505	585	636
Minimum		27.4	134	2.1	-12	-30	0.052	100.0	0.01	1A	0.00	316	389	459	552	600
Maximum		44.3	222	3.5	30	20	1.02	176	.30	3	< .1	450	487	543	635	675

1/ District letters refer to the areas in which the fuels are sold (see fig. 1). In each item the arrangement of district letters indicates in decreasing order the relative volumes of the fuel. Fuels of grade 1 listed above the line separating items 110 and 74 in the Western region and fuels of grade 2 listed above the line separating items 157 and 160 are generally sold in greatest volume in the respective regions. The fuels listed below the lines are generally sold in lesser volumes in the respective regions than in some other regions.

2/ Some of the determinations were made by the Conradson method, ASTM D189-52, and the data were converted to Ramsbottom values using table 1 and figure 4 in the appendix of the Conradson method.

3/ Distillation figures have been converted, where necessary, to temperatures at 760 mm. Hg according to table 1 in ASTM D86-52. 4/ Flash point by Pensky-Martens closed tester, ASTM D93-52.

5/ Determined by lamp method, ASTM D90 or D1266. 6/ Does not meet the requirement of fuels of this grade. 7/ Produced and distributed in western Canada, north of districts H and L.

8/ Corrosion test for one hour at 212° F. 9/ Flash point by Tag closed tester, ASTM D56-52. 10/ On 100 percent sample, not included in average.

11/ Produced and distributed in eastern Canada, north of districts A and C.

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TABLE 7.--Analyses of grade 2 burner fuel oils, 1956 (Cont.)

Southern region: District D

Item	Distributed in districts 1/	Gravity ASTM D287 ° API	Flash point ASTM D93 °F.	Viscosity kinematic at 100° F. ASTM D445 Cs.	Cloud test ASTM D97 °F.	Pour point ASTM D97 °F.	Sulfur content ASTM D129 Wt. pct.	Aniline point ASTM D611 °F.	Carbon residue Ramsbottom 2/ ASTM D524 On 10 percent Resid., pct.	Corrosion ASTM D130 3 hours at 122° F.	Water and sediment ASTM D96 Vol. pct.	Distillation 3/ ASTM D158 Temperature, °F. IBP	Pct. recovered 10	50	90	End point
158	D	33.4	154	2.55	-	0	0.05	136	0.29	1	< 0.01	348	427	515	584	642
159	D	47.2	145	2.1	< -35	<-45	.05	168	.11	1	< .1	411	422	431	457	530
160	D, B, A	32.0	160	2.74	< 0	-5	.19	-	.12	1	.01	335	436	522	583	621
161	D, B, C	32.9	170	3.1	10	0	.09	140	.06	1A	.0	366	450	508	580	652
162	D, E, C	30.7	166	2.1	0	-10	.4	120	.1	-	.0	366	438	504	598	642
111	A, B, C, D	33.2	158	2.7	-	0	.54	134	.13	1A	-	350	418	508	596	648
122	B, A, C, D	33.0	140	-	-	0	.45	-	.16	< 1	.00	320	420	506	588	640
123	B, A, D	31.9	152	-	-	-	.53	-	-	4/ 3	-	316	438	503	600	638
124	B, A, D	35.3	164	2.45	0	-5	.64	-	.18	1	.0	361	430	497	570	627
125	B, A, D, C, G, E	32.2	152	2.55	0	-10	.52	127.5	.19	1	Trace	338	432	510	594	634
131	B, D	34.3	154	2.38	6	-5	.19	133	.24	1	.01	360	432	480	580	648
132	B, D, A	34.3	146	2.4	0	-10	.53	130	.15	1	.0	328	406	499	586	638
133	B, D, E	34.9	162	2.58	6	0	.066	143.5	.20	1	-	369	422	505	589	663
154	C, E, D	30.7	222	3.25	-6	< -10	.16	128.0	.14	1A	.0	450	480	522	580	634
181	F, E, G, D	35.3	158	2.44	-	-5	.40	158	.20	1	.0	356	416	480	568	634
182	F, E, G, D	33.9	142	2.27	10	-5	.27	129	.16	1	.0	326	392	492	576	624
188	G, D	37.5	144	2.43	14	0	.47	143.8	.10	1	.0	328	386	498	610	630
Average (17 samples)		34.3	-	2.54	-	-	0.326	137.8	0.158	-	0.00	355	426	499	579	632
Minimum		30.7	140	2.1	-35	-45	0.05	120	0.06	1	0.00	316	386	431	457	530
Maximum		47.2	222	3.25	14	0	.64	168	.29	3	< .1	450	480	522	610	663

Central region: Districts E, F, and G

163	E	36.3	138	2.4	-	-5	0.25	143	0.19	1A	Trace	316	378	496	591	636
164	E	37.0	168	2.89	16	0	.74	157.0	.15	1	do	368	432	512	608	674
165	E	31.6	164	1.7	5	0	.931	-	.164	1	0.0	400	454	534	588	622
166	E	39.4	128	-	-	-	.465	-	-	1	.0	360	397	490	576	609
167	E	33.1	163	2.76	-	-5	.18	140	.215	1	< .01	356	440	524	590	642
168	E, C	34.5	160	3.0	-8	-5	.45	130	.12	1	.0	360	410	500	567	600
169	E, C	27.4	174	2.88	0	0	.281	111.2	.14	1	< .1	400	481	521	578	618
170	E, C	36.4	155	2.19	-2	-15	.737	136.4	.09	1A	.01	350	389	470	569	632
171	E, C	33.2	148	2.4	-	0	.35	135	.20	1A	-	318	415	500	576	623
172	E, C	36.5	160	2.36	-5	-10	.108	143	.08	1B	.0	360	420	486	570	632
173	E, C, G	33.9	176	2.39	< 0	-5	[illegible]	132	.22	1	Trace	392	436	499	580	641
174	E, C, G	37.5	150	2.53	15	0	.21	150.8	.09	1	.0	335	406	516	608	650
175	E, F, G	35.5	158	2.44	-	-5	.409	133.9	.05	1	.0	372	433	504	570	612
176	E, F, G	36.2	165	2.47	2	-5	.18	148	.17	1	.00	358	426	492	576	636
177	E, G	29.4	160	2.5	0	-5	.92	118	.15	1	.0	352	438	540	592	626
178	E, G	38.6	134	2.38	2	0	.195	150.8	.082	1A	.00	344	394	500	590	648
179	E, G	33.4	170	2.5	-	0	.48	135	.18	1A	Trace	354	437	500	574	618
180	E, G, F	36.6	160	2.26	-5	-15	5/ .11	142.5	.09	1	.00	356	424	482	562	624
181	F, E, G, D	35.3	158	2.44	-	-5	.40	158	.20	1	.0	356	416	480	568	634
182	F, E, G, D	33.9	142	2.27	10	-5	.27	129	.16	1	.0	326	392	492	576	624
183	F, G, E	39.2	158	2.13	0	-5	.08	141.4	.08	1	.000	360	420	480	549	604
184	G	36.4	156	2.1	0	-5	.435	140	-	1	.000	362	433	503	573	620
185	G	36.3	162	2.8	0	0	.275	148.0	-	1A	.0	344	436	502	575	626
186	G	34.2	6/ 160	2.2	-	-15	.23	130	.15	1A	.0	-	419	482	551	617
187	G	38.4	194	2.90	-8	-10	.09	162	.08	1	.0	434	478	505	552	598

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188	G, D	37.5	144	2.43	14	0	.47	143.8	10	1	.0	328	386	498	610	630
189	G, E, F	32.5	172	2.54	4	-5	.27	129.2	.16	1A	Trace	350	436	506	582	618
190	G, E, F	33.3	182	2.76	0	-5	5/ .392	131.4	.115	1	.00	377	437	521	573	601
191	G, F	33.0	166	2.59	-5	-5	.18	129.2	.17	1	Trace	370	438	510	572	611
192	G, F	32.5	156	2.25	-8	-20	.37	124	.13	1	.0	358	429	497	568	615
193	G, F, E	34.5	168	2.26	-14	-20	.43	131	.152	1	.0	376	434	490	550	596
194	G, F, E	35.5	148	2.30	0	-5	.25	134	.08	1	.0	342	420	506	566	608
195	G, F, E	34.5	164	2.50	-4	-5	.186	144	.191	1	.0	328	415	515	600	642
196	G, F, I	35.2	155	2.6	0	-5	.23	144	.16	1	.0	368	429	500	586	650
197	G, J	37.7	167	3.3	5	-10	.304	154	.06	1	.0	382	436	501	587	650
125	B, A, D, C, G, E	32.2	152	2.55	0	-10	.52	127.5	.19	1	Trace	338	432	510	594	634
133	B, D, E	34.9	162	2.58	6	0	.066	143.5	.20	1	-	369	422	505	589	663
149	C, E	37.5	175	3.31	10	0	.28	158.5	.07	1B	.00	376	454	536	600	632
150	C, E	40.1	163	2.39	-8	-20	.11	158.1	.09	1	Trace	367	426	489	562	624
151	C, E	28.9	200	3.33	14	-10	.35	125.3	.23	1	do	429	483	543	608	646
152	C, E, A	36.2	155	2.38	-12	-15	.18	141.4	.17	1	do	359	429	495	560	600
153	C, E, A	28.3	215	3.02	14	-5	.33	114.5	.21	1	.0	428	481	524	578	609
154	C, E, D	30.7	222	3.25	-6	< -10	.16	128.0	.14	1A	.0	450	480	522	580	634
162	D, E, C	30.7	166	2.1	0	-10	.4	120	.1	-	.0	366	438	504	598	642
207	I, G, F, H	32.5	158	3.00	5	0	.20	133	< .10	1A	.0	364	439	516	597	643
Average (45 samples)		34.6	-	2.55	-	-	0.339	137.9	0.140	-	0.00	365	430	504	579	627
Minimum		27.4	128	1.7	-14	-20	0.066	111.2	0.05	1A	0.000	316	378	470	549	596
Maximum		40.1	222	3.33	16	0	.931	162	.23	1	< .1	450	483	543	610	674

Rocky Mountain region: Districts H, I, J, and K

198	H	37.4	170	3.44	5	-10	0.763	158	0.003	1	0.0	372	457	507	564	615
199	H	37.1	196	3.15	6	5	5/ .28	157.6	.09	1A	< .1	412	468	522	599	677
200	H, L, K, I	34.5	170	2.6	-5	-15	7/ 1.4	139	.06	1	.0	382	433	519	624	676
201	I	35.9	172	1.84	-35	-40	7/ .120	-	.125	1	.00	377	427	451	485	533
202	I	39.2	158	2.33	-10	-15	.06	154	.06	1	.00	375	428	491	561	596
203	I	38.3	164	2.55	-5	-10	.62	154	.091	1	.0	381	422	494	566	607
204	I	36.7	164	2.58	-5	-10	.73	153	.105	1	.0	387	436	500	571	613
205	I	37.9	6/ 160	2.05	-	-30	.64	139	.09	1A	-	357	408	452	511	555
206	I	35.7	185	2.46	-10	-15	.618	140.5	.11	1A	.0	407	441	479	565	633
207	I, G, F, H	32.5	158	3.00	5	0	.20	133	< .10	1A	.0	364	439	516	597	643
208	J	37.0	190	-	10	-10	.21	154.2	.06	1	.0	416	461	515	579	616
209	K	27.6	184	2.70	-4	-10	.79	96.1	.15	1A	.00	389	462	517	574	622
210	K, L	37.0	156	2.65	-6	-10	.45	152.5	.06	1A	.00	355	434	505	582	634
211	K, L	41.6	138	1.90	-24	-40	.24	152.4	.06	1A	.00	332	389	451	534	585
212	K, L, M, N	35.4	168	3.12	5	0	.51	154	.06	1	.0	364	453	523	586	621
213	K, M, N	7/ 24.1	215	2.74	-30	-30	.93	69	.17	1	.0	457	474	488	519	559
214	Western Canada 8/	27.8	139	1.85	-20	-35	.650	75	.16	1A	.0	345	423	466	533	596
215	Do 8/	40.5	135	1.77	-16	-25	.17	144	.09	1A	Trace	357	379	432	543	608
196	G, F, I	35.2	155	2.6	0	-5	.23	144	.16	1	.0	368	429	500	586	650
197	G, J	37.7	167	3.3	5	-10	.304	154	.06	1	.0	382	436	501	587	650
Average (20 samples)		35.5	-	2.56	-	-	0.496	138.1	0.093	-	0.00	379	435	491	563	614
Minimum		24.1	135	1.77	-35	-40	0.06	69	0.003	1A	0.00	332	379	432	485	533
Maximum		41.6	215	3.44	10	5	1.4	158	.17	1	< .1	457	474	523	624	677

1/ District letters refer to the areas in which the fuels are sold (see fig. 1). In each item the arrangement of district letters indicates in decreasing order the relative volumes of the fuel. above the lines separating items 162 and 111 in the Southern region, items 197 and 125 in the Central region, items 215 and 196 in the Rocky Mountain region, are generally sold in greatest volume in those respective regions. The fuels listed below the lines are generally sold in lesser volumes in the respective regions than in some other regions.

2/ Some of the determinations were made by the Conradson method, ASTM D189-52, and the data were converted to Ramsbottom values using table 1 and figure 4 in the appendix of the Conradson method. 3/ Distillation figures have been converted, where necessary, to temperatures at 760 mm. Hg according to table 1 in ASTM D86-52.

4/ Result of corrosion test for one hour at 212° F. 5/ Sulfur by lamp method, ASTM D90 or D1266. 6/ Flash point by Tag closed tester, ASTM D56-52.

7/ Does not meet the requirement of fuels of this grade. 8/ Produced and distributed in western Canada, north of districts H and L.

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TABLE 7.--Analyses of grade 2 burner fuel oils, 1956 (Cont.)

Western region: Districts L, M, and N

Item	Distributed in districts 1/	Gravity ASTM D297 °API	Flash point ASTM D56 °F.	Viscosity, kinematic at 100° F. ASTM D445 Cs.	Cloud test ASTM D97 °F.	Pour point ASTM D97 °F.	Sulfur content ASTM D129 Wt. pct.	Aniline point ASTM D611 °F.	Carbon residue Ramsbottom 2/ ASTM D524 On 10 percent Resid., percent	Corrosion ASTM D130 3 hours at 122° F.	Water and sediment ASTM D96 Vol. pct.	Distillation 3/ ASTM D158 Temperature, °F. IBP	Pct. recovered 10	50	90	End point
216	L	40.6	130	1.83	<-20	<-20	0.40	-	0.08	-	Trace	312	390	444	503	546
217	L	36.5	164	2.99	22	15	.60	154	.15	-	do	350	435	525	625	675
218	L, M	34.9	140	2.02	<-20	-30	.14	-	.08	-	do	340	392	450	510	564
219	L, M	31.0	182	3.69	0	-5	.39	-	.16	-	do	386	450	530	650	714
220	L, M	35.5	160	2.19	-48	<-40	.20	131.4	.08	2	0.00	356	414	468	536	578
221	L, M	30.2	188	3.80	-5	-5	.50	131.4	.10	2	.00	368	458	534	612	680
222	L, M	31.5	168	2.94	-	-10	.44	130	.25	1	.0	384	440	510	604	674
223	L, M, N	32.6	176	3.64	10	0	.59	144	.1	1B	.0	380	458	540	618	674
224	L, N	38.0	144	1.83	<-20	<-20	.40	-	.13	1	-	358	402	446	501	554
225	L, N	36.0	158	1.99	-50	<-40	.57	130.0	.06	2	.00	374	402	449	522	572
226	L, N	31.3	196	3.89	2	5	.95	136.0	.06	2	.00	398	460	536	630	688
227	M, L	31.9	196	4.22	28	7/25	5/.25	151.5	.12	1A	<.1	408	486	560	632	677
228	N	34.5	178	3.22	10	5	.33	154.4	.19	1	.0	384	454	516	602	665
229	N	33.0	186	7/4.48	28	7/25	.27	158.7	.08	1A	<.1	398	498	564	630	698
230	N	32.2	182	3.64	4	0	5/.80	141	.11	1A	<.1	380	464	536	605	650
231	N	32.0	230	4.3	15	5	.65	155	.10	1	.00	450	490	550	625	675
232	N, L	32.7	192	3.3	10	5	.90	-	.21	1	Trace	417	466	527	632	707
233	N, M	37.1	126	1.50	-50	<-40	.18	121.0	.08	2	.00	342	370	409	460	491
234	N, M	33.6	166	3.33	2	0	.42	139.0	.11	2	.00	378	434	508	600	664
200	H, L, K, I	34.5	170	2.6	-5	-15	7/1.4	139	.06	1	.0	382	433	519	624	676
210	K, L	37.0	156	2.65	-6	-10	.45	152.5	.06	1A	.00	355	434	505	582	634
211	K, L	41.6	138	1.90	-24	-40	.24	152.4	.06	1A	.00	332	389	451	534	585
212	K, L, M, N	35.4	168	3.12	5	0	.51	154	.06	1	.0	364	453	523	586	621
213	K, M, N 7/	24.1	215	2.74	-30	-30	.93	69	.17	1	.0	457	474	488	519	559
214	Western Canada 8/	27.8	139	1.85	-20	-35	.650	75	.16	1A	.0	345	423	466	533	596
215	Do 8/	40.5	135	1.77	-16	-25	.17	144	.09	1A	Trace	357	379	432	543	608
Average (26 samples)		34.1	-	2.90	-	-	0.513	136.3	0.112	-	0.00	375	436	499	578	632
Minimum		24.1	130	1.50	-50	<-40	0.14	69	0.06	1A	0.00	312	370	409	460	491
Maximum		41.6	230	4.48	28	25	1.4	158.7	.25	2	<.1	457	498	564	650	714

1/ District letters refer to the areas in which the fuels are sold (see fig. 1). In each item the arrangement of district letters indicates in decreasing order the relative volumes of the fuel. Fuels listed above the lines separating items 162 and 111 in the Southern region, items 197 and 125 in the Central region, items 215 and 196 in the Rocky Mountain region, and items 234 and 200 in the Western region are generally sold in greatest volume in those respective regions. The fuels listed below the lines are generally sold in lesser volumes in the respective regions than in some other regions.

2/ Some of the determinations were made by the Conradson method, ASTM D189-52, and the data were converted to Ramsbottom values using table 1 and figure 4 in the appendix of the Conradson method. 3/ Distillation figures have been converted, where necessary, to temperatures at 760 mm. Hg according to table 1 in ASTM D86-52.

4/ Result of corrosion test for one hour at 212° F. 5/ Sulfur by lamp method, ASTM D90 or D1266. 6/ Flash point by Tag closed tester, ASTM D56-52.

7/ Does not meet the requirement of fuels of this grade. 8/ Produced and distributed in western Canada, north of districts H and L.

TABLE 8.--Analyses of grade 4 burner fuel oils, 1956

Eastern region: Districts A, B, and C

Item	Distributed in districts 1/	Gravity ASTM D287 °API	Flash point ASTM D93 °F.	Viscosity, kinematic at 100° F. ASTM D445 Cs.	Pour point ASTM D97 °F.	Sulfur content ASTM D129 Wt. pct.	Aniline point ASTM D611 °F.	Carbon residue Ramsbottom 2/ ASTM D524 On 100 percent sample, percent	Corrosion ASTM D130 3 hours at 122° F.	Ash ASTM D482 Wt. pct.	Water and sediment ASTM D96 Vol. pct.	Distillation 3/ ASTM D158 Temperature, °F. IBP	Pct. recovered 10	50	90	End point
235	A, B	25.6	162	10.43	<-40	1.35	-	0.19	-	0.001	0.0	-	-	-	-	-
236	A, B	14.7	190	13.50	-65	.92	-	5.01	-	.010	.4	-	-	-	-	-
237	B	20.7	206	4/ 5.34	<-20	.31	116.2	5/ .41	1A	.002	.1	6/ 375	463	535	730	840
238	B	19.1	225	19.8	-40	1.87	-	4.91	-	.023	.1	-	-	-	-	-
239	B	18.1	240	4/ 4.49	-10	.24	-	.28	-	.000	.1	-	-	-	-	-

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240	B	20.3	200	7.4	-40	.35	-	.43	-	.01	.1	-	-	-	-	-
241	B	20.3	186	18.4	-30	1.7	-	.45	-	.00	Trace	-	-	-	-	-
242	B	23.0	170	19.7	-20	.80	-	1.5	-	.03	.1	-	-	-	-	-
243	B, A	14.8	216	25.4	-20	.23	-	3.45	-	.008	.05	-	-	-	-	-
244	B, A, C	13.7	160	12	-50	.37	-	4.33	-	.000	.2	-	-	-	-	-
245	B, C	22.3	182	7.6	0	.99	-	2.16	-	.04	.20	-	-	-	-	-
246	B, C	17.5	180	25.2	-5	2.10	-	7.35	-	.030	.130	-	-	-	-	-
247	C	32.9	205	7.43	10	.30	-	-	-	.0	.1	-	-	-	-	-
248	C	33.2	168	7.03	-5	.30	-	-	-	.0	.1	-	-	-	-	-
249	C	16.1	172	15.9	-15	.55	-	4.00	-	-	.2	-	-	-	-	-
250	C	32.7	230	7.5	0	.38	-	1.20	-	.0	.3	-	-	-	-	-
251	C	25.0	194	14.4	20	.45	-	5.1	-	.02	.4	-	-	-	-	-
252	C	27.5	152	17.2	<-10	.53	-	5.0	-	.03	.1	-	-	-	-	-
253	C	15.1	194	21.7	-5	.44	-	6.66	-	.05	.10	-	-	-	-	-
254	C	22.1	>230	21.3	<-10	.40	-	2.3	-	.012	.1	-	-	-	-	-
255	C	21.7	215	17.04	10	.51	-	3.66	-	.007	Trace	-	-	-	-	-
256	C, E	8.7	225	18.82	-30	.59	-	4.33	-	.005	.1	-	-	-	-	-
257	Eastern Canada 7/	26.3	160	4.89	-5	.85	-	2.3	-	.01	.1	-	-	-	-	-
258	D, B	21.7	216	10.2	0	.9	-	.4	-	.001	Trace	448	620	674	716	>760
263	E, C	17.7	185	21.70	-15	1.54	-	4.89	-	.04	.1	-	-	-	-	-
Average (25 samples)		21.2	-	14.17	-	0.759	-	3.06	-	0.014	0.14	-	-	-	-	-
Minimum		8.7	152	4.49	-65	0.23	-	0.19	1A	0.000	0.0	375	463	535	716	760
Maximum		33.2	230	25.4	20	2.10	-	7.35	-	.05	.4	448	620	674	730	840
Southern region: District D																
258	D, B	21.7	216	10.2	0	0.9	-	0.4	-	0.001	Trace	448	620	674	716	>760
Central region: Districts E, F, and G																
259	E	29.0	180	4/ 3.6	10	1.38	-	-	-	-	Trace	-	-	-	-	-
260	E	24.1	180	19.1	25	1.62	-	4.72	-	0.082	0.1	-	-	-	-	-
261	E	36.3	156	6.8	-	.471	-	-	-	-	Trace	-	-	-	-	-
262	E	19.0	162	15.72	0	.70	-	4.22	-	.01	.10	-	-	-	-	-
263	E, C	17.7	185	21.70	-15	1.54	-	4.89	-	.04	.1	-	-	-	-	-
264	E, F, G	12.4	190	23.6	-20	.94	-	6.5	-	.01	.10	-	-	-	-	-
265	E, G	32.2	168	4/ 2.38	5	.328	-	.111	-	.00	.00	388	438	522	598	655
256	C, E	8.7	225	18.82	-30	.59	-	4.33	-	.005	.1	-	-	-	-	-
Average (8 samples)		22.4	-	13.97	-	0.946	-	4.13	-	0.025	0.08	-	-	-	-	-
Minimum		8.7	156	2.38	-30	0.328	-	0.111	-	0.00	0.00	-	-	-	-	-
Maximum		36.3	225	23.6	25	1.62	-	6.5	-	.082	.1	-	-	-	-	-
Rocky Mountain region: Districts H, I, J, and K 8/																
266	H, L, K, I	30.0	200	4/ 4.4	0	2.2	142	0.07	1	0.00	0.0	528	557	588	635	686
267	J	23.7	200	9/ (15)	-20	1.48	-	2.46	-	.002	.1	-	-	-	-	-
Western region: Districts L, M, and N																
266	H, L, K, I	30.0	200	4/ 4.4	0	2.2	142	0.07	1	0.00	0.0	528	557	588	635	686

1/ District letters refer to the areas in which the fuels are sold (see fig. 1). In each item the arrangement of district letters indicates in decreasing order the relative volumes of the fuel. Fuels listed above the lines separating items 257 and 258 in the Eastern region, items 265 and 256 in the Central region are generally sold in greatest volume in those respective regions. The fuels listed below the lines are generally sold in lesser volumes in the respective regions than in some other regions.

2/ Some of the determinations were made by the Conradson method, ASTM D189-52, and the data were converted to Ramsbottom values using table 1 and figure 4 in the appendix of the Conradson method.

3/ Distillation figures have been converted, where necessary, to temperatures at 760 mm. Hg according to table 1 in ASTM D86-52. 4/ Does not meet the requirement of fuels of this grade

5/ Ramsbottom carbon residue on 10 percent residue, 2.87 percent.

6/ Equivalent distillation temperatures at 760 mm. Hg converted from figures at 10 mm. pressure according to chart (fig. 5) in the report by Beale, E. S. L., and Docksey, P., A Wide Range Boiling-Point Conversion Chart for Hydrocarbons and Petroleum Products: Jour. Inst. Petrol. Technol., vol. 21, 1935, pp. 860-870. 7/ Produced and distributed in eastern Canada, north of districts A and C.

8/ No average values are shown as only two samples are represented. 9/ Viscosity in Furol seconds at 122° F.

Note: A column for cloud test is not shown as this test is not required in the survey for this grade. One sample, item 266, had a reported cloud test of 10° F.

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TABLE 9.--Analyses of grade 5 burner fuel oils, 1956

Item	Distributed in districts 1/	Gravity ASTM D287 °API	Flash point ASTM D93 °F.	Viscosity Kinematic at 100° F. ASTM D445 Cs.	Viscosity Furol at 122° F. ASTM D88 Sec.	Pour point ASTM D97 °F.	Sulfur content ASTM D129 Wt. pct.	Carbon residue, Ramsbottom 2/ ASTM D524 On 100 percent sample, percent	Ash ASTM D482 Percent	Water and sediment ASTM D96 Vol. pct.
Eastern region: Districts A, B, and C										
268	A, B	19.8	180	3/ 32.0	-	-5	1.5	5.8	0.04	0.1
269	B	14.8	190	77	11	-20	.8	3.9	.02	.13
270	B	16.5	185	41.5	21.4	-30	1.87	7.90	.021	.2
271	B	18.8	180	39.8	17	-20	1.4	3.1	.03	.1
272	B, A, C, D	18.6	165	42	-	-10	-	-	.05	.10
273	C	13.2	198	-	32.4	10	.78	-	-	.2
274	C	23.6	270	64.9	22.0	20	1.47	5.50	-	.2
275	C	10.5	200	54.6	18	0	.60	4.20	-	.2
276	C	14.1	185	50.8	-	0	.58	6.00	.0	.2
277	C	22.0	214	122	34	40	.50	6.2	.05	.4
278	C	21.6	136	135.7	39.8	<-10	.69	5.6	.04	.1
279	C	10.1	225	110.0	25.6	5	.62	8.34	.09	.15
280	C	20.4	> 230	3/ 25.5	14.0	<-10	.42	2.9	.016	.1
281	C	17.9	215	80.3	-	25	.66	5.43	.015	Trace
282	C, E	8.4	255	83.1	-	-5	.64	5.00	.007	.1
283	Eastern Canada 4/	16.3	165	121.9	35	15	1.32	9.1	.04	.3
284	Do 4/	18.3	185	-	30	5	1.26	6.05	.03	.2
290	E, C	15.8	190	119.8	33.0	35	2.00	6.21	.09	.3
291	E, C, G	11.6	198	-	-	-5	2.4	4.6	.08	-
Average (19 samples)		16.4	-	75.1	25.6	-	1.08	5.64	0.039	0.18
Minimum		8.4	136	25.5	11	-30	0.42	2.9	0.0	Trace
Maximum		23.6	270	135.7	39.8	40	2.4	9.1	.09	.4
Southern region: District D										
285	D	17.7	214	47.83	18	<-20	0.59	6.25	0.05	0.2
272	B, A, C, D	18.6	165	42	-	-10	-	-	.05	.10
298	G, D	14.6	220	133	36	40	2.68	3.9	.06	.2
299	G, D	15.6	200	63.5	21.7	-10	1.45	7.95	.022	.20
Average (4 samples)		16.6	-	71.6	25.2	-	1.57	6.03	0.046	0.18
Minimum		14.6	165	42	18	<-20	0.59	3.9	0.022	0.10
Maximum		18.6	220	133	36	40	2.68	7.95	.06	.20
Central region: Districts E, F, and G										
286	E	12.5	164	-	17	<-10	3.52	11.2	0.025	0.20
287	E	19.2	225	129.0	31.5	45	1.71	7.70	.060	.2
288	E	17.6	178	117.4	28.5	-	1.456	-	-	.2
289	E	15.8	164	54.0	19	0	.74	9.20	.04	.03
290	E, C	15.8	190	119.8	33.0	35	2.00	6.21	.09	.3
291	E, C, G	11.6	198	-	-	-5	2.4	4.6	.08	-
292	E, F, G	14.3	160	58.6	20.0	-25	.61	7.0	.01	.1
293	E, G	24.8	-	48.7	17	-20	.54	4.13	.05	.20
294	G	9.2	198	49.1	22	-5	1.27	-	3/ .12	.25
295	G	5.5	240	-	16	0	.885	-	.00	.7

1/ District letters refer to the areas in which the fuels are sold (see fig. 1). In each item the arrangement of district letters indicates in decreasing order the relative volumes of the fuel. Fuels listed above the lines separating items 284 and 290 in the Eastern region, items 285 and 272 in the Southern region, items 301 and 282 in the Central region, and items 318 and 303 in the Western region are generally sold in greatest volume in those respective regions. The fuels listed below the lines are generally sold in lesser volumes in the respective regions than in some other region.

2/ Some of the determinations were made by the Conradson method, ASTM D189-52, and the data converted to Ramsbottom values using table 1 and figure 4 in the appendix of the Conradson method. 3/ Does not meet the requirement of fuels of this grade.

4/ Produced and distributed in eastern Canada, north of districts A and C.

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TABLE 9.--Analyses of grade 5 burner fuel oils, 1956 (Cont.)

Item	Distributed in districts 1/	Gravity ASTM D297 °API	Flash point ASTM D93 °F.	Viscosity: Kinematic at 100° F. ASTM D445 Cs.	Viscosity: Furol at 122° F. ASTM D88 Sec.	Pour point ASTM D97 °F.	Sulfur content ASTM D129 Wt. pct.	Carbon residue Ramsbottom 2/ ASTM D524 On 100 percent sample, percent	Ash ASTM D482 Percent	Water and sediment ASTM D96 Vol. pct.
Central region: Districts E, F, and G (Cont.)										
296	G	14.3	156	3/15.15	11	0	.76	4.59	.004	.1
297	G	16.6	200	-	30.8	10	.71	4.87	.07	.1
298	G, D	14.6	220	133	36	40	2.68	3.9	.06	.2
299	G, D	15.6	200	63.5	21.7	-10	1.45	7.95	.022	.20
300	G, E	21.6	176	72.9	24.0	15	.706	10.26	.020	.20
301	G, E, F	12.7	185	79.5	22.5	-5	1.38	-	.051	.3
282	C, E	8.4	255	83.1	-	-5	.64	5.00	.007	.1
Average (17 samples)		14.7	-	78.8	23.3	-	1.38	6.66	0.044	0.21
Minimum		5.5	156	15.15	11	-25	0.54	3.9	0.00	0.03
Maximum		24.8	255	133	36	45	3.52	11.2	.12	.7
Rocky Mountain region: Districts H, I, J, and K										
302	H	0.0	200	101.9	39	10	4.235	14.4	0.01	0.0
303	H, L, K, I	17.5	300	167	38	40	4.7	4.4	.02	Trace
304	I	7.2	235	-	17.4	5	2.96	6.42	.016	.0
305	I	6.6	250	47.0	16.0	-5	2.40	4.90	.003	.2
306	K	21.4	300	-	36.7	40	1.20	6.1	.01	.10
307	K	14.7	214	179.1	39.0	10	1.56	9.64	.08	.2
308	Western Canada 5/	10.5	165	75	15	5	.65	6.03	Trace	.8
309	Do 5/	20.5	245	3/ 13.5	12	50	.94	1.75	.01	.1
Average (8 samples)		12.3	-	97.3	26.6	-	2.33	6.71	0.021	0.20
Minimum		0.0	165	13.5	12	-5	0.65	1.75	0.003	0.0
Maximum		21.4	300	179.1	39	50	4.7	14.4	.08	.8
Western region: Districts L, M, and N										
310	L, M	12.2	210	-	28.3	-5	0.94	5.6	0.06	0.10
311	L, M	13.6	200	-	33.5	-15	.80	11.0	.03	.20
312	L, M, N	14.6	200	-	33	0	1.66	14.3	.04	.2
313	L, N	11.8	184	-	34.0	-15	1.96	11.0	.04	.10
314	M, N	12.0	182	-	32.0	0	1.27	9.5	.04	.1
315	M, N, L	13.2	184	-	30	0	1.24	9.0	.05	.1
316	N	12.3	200	-	19	-25	1.21	11.0	.03	.1
317	N, L	15.2	190	-	29	<-10	1.65	9.5	.02	.1
318	N, M	17.2	204	-	38.0	-20	.95	3.5	.02	.10
303	H, L, K, I	17.5	300	167	38	40	4.7	4.4	.02	Trace
308	Western Canada 5/	10.5	165	75	15	5	.65	6.03	Trace	.8
309	Do 5/	20.5	245	3/ 13.5	12	50	.94	1.75	.01	.1
Average (12 samples)		14.2	-	-	28.5	-	1.50	8.05	0.03	0.2
Minimum		10.5	165	13.5	12	-25	0.65	1.75	Trace	Trace
Maximum		20.5	300	167	38	50	4.7	14.3	0.06	0.8

1/ District letters refer to the areas in which the fuels are sold (see fig. 1). In each item the arrangement of district letters indicates in decreasing order the relative volumes of the fuel. Fuels listed above the lines separating items 284 and 290 in the Eastern region, items 285 and 272 in the Southern region, items 301 and 282 in the Central region, and items 318 and 303 in the Western region are generally sold in greatest volume in those respective regions. The fuels listed below the lines are generally sold in lesser volumes in the respective regions than in some other region.

2/ Some of the determinations were made by the Conradson method, ASTM D189-52, and the data converted to Ramsbottom values using table 1 and figure 4 in the appendix of the Conradson method. 3/ Does not meet the requirement of fuels of this grade.

5/ Produced and distributed in western Canada, north of districts H and L.

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TABLE 10.--Analyses of grade 6 burner fuel oils, 1956

Eastern region: Districts A, B, and C

Item	Distributed in districts 1/	Gravity ASTM D287 ° API	Viscosity, Flash point ASTM D93 °F.	Viscosity, Furol at 122° F. ASTM D88 Sec.	Pour point ASTM D97 °F.	Sulfur content ASTM D129 Wt. pct	Carbon residue, Ramsbottom 2/ ASTM D524 On 100 percent sample, percent	Ash ASTM D482 Percent	Water and sediment ASTM D96 Vol. pct.
319	A, B	10.3	216	171	35	1.9	11.4	0.05	0.3
320	A, D	7.3	208	203	15	1.61	13.03	.020	.4
321	B	11.8	200	161	15	.82	15.7	.05	.2
322	B	14.5	190	170	50	3/2.0	14.0	.06	.2
323	B	15.4	190	174	45	4/1.0	9.5	.04	.2
324	B	9.6	180	258	50	.93	13.4	.05	.3
325	B	10.1	182	186	45	2.30	13.9	.04	.3
326	B	14.8	195	183	50	3.88	11.3	.018	Trace
327	B	12.9	205	175	25	2.09	9.8	-	.3
328	B	15.3	199	161	20	3.1	6.6	.06	Trace
329	B	11.1	176	185	35	2.58	-	-	.1
330	B, A	10.6	206	170	35	1.83	12.08	.08	.3
331	B, A	12.1	194	178	50	3.37	10.3	.028	.1
332	B, A	9.0	214	220	25	2.68	9.6	.066	.1
333	B, A, D	10.9	195	139	35	1.80	-	.02	.2
334	B, A, D	10.8	194	150	40	.68	12	.07	.3
335	B, A, D, C	11.7	>160	140	20	2.18	-	.09	.30
336	B, C	18.2	230	5/ 40.5	50	.29	4.2	.28	.2
337	B, C	15.4	250	148	35	.70	5.78	.04	.2
338	B, C	12.5	220	135	40	3.18	9.52	.04	.2
339	B, C, A	10.0	175	198	35	2.70	11.5	.040	.14
340	B, C, D	14.3	285	145.1	20	.63	6.0	.04	.1
341	B, D	18.8	170	178.4	50	.58	15.0	.005	-
342	B, D, A	11.9	265	141.2	30	1.67	11.6	.08	.1
343	C	13.5	200	62.7	15	.83	6.20	-	.27
344	C	15.7	285	115	30	1.81	8.70	-	.2
345	C	14.3	215	45	30	.70	4.75	-	.2
346	C	13.6	172	5/ 41	5	.68	7.10	.004	.2
347	C	15.8	240	198	60	.75	7.8	.08	.5
348	C	18.4	5/140	196	15	.81	8.0	.06	.1
349	C	7.1	265	228	25	.91	12.30	.1	.30
350	C	15.5	>230	183	50	.64	6.05	.071	.15
351	C	14.4	240	166	55	.80	7.49	.030	.1
352	C	17.0	235	95	50	.71	-	.0	1.5
353	C	13.5	180	67	20	.62	9.72	.02	.2
354	C	11.2	235	184	50	.71	9.94	.04	.3
355	C	16.6	184	134	50	.79	6.2	.09	1.0
356	C, E	8.5	235	5/ 28.2	5	.64	5.64	.015	.1
357	Eastern Canada 6/	15.5	>230	85	25	1.29	5.30	.05	.3
358	Do 6/	13.0	175	140	40	1.68	13.0	.06	.4
359	Do 6/	12.2	194	123.5	40	.873	14.1	.084	.4
361	D, B	9.8	190	173	25	2.36	-	.07	.05
362	D, B, A	13.2	204	74	0	2.02	10.24	.017	.3
372	E, C	12.3	235	98.0	30	2.08	6.51	.05	.1
373	E, C	15.7	176	7/ (318.0)	-	.61	7.0	.013	-
374	E, C	5.8	170	238	35	.65	1.67	.05	.2
Average (46 samples)		12.9	-	148.5	-	1.47	9.36	0.053	0.27
Minimum		5.8	140	28.2	0	0.29	1.67	0.0	0.05
Maximum		18.8	285	258	60	3.88	15.7	.28	1.5

1/ District letters refer to the areas in which the fuels are sold (see fig. 1). In each item the arrangement of district letters indicates in decreasing order the relative volumes of the fuel. Fuels listed above the line separating items 359 and 361 are generally sold in greatest volume in the Eastern region. The fuels listed below the line are generally sold in lesser volumes in that region than in some other region.

2/ Some of the determinations were made by the Conradson method, ASTM D189-52, and the data converted to Ramsbottom values using table 1 and figure 4 in the appendix of the Conradson method. 3/ Designated high-sulfur fuel.

4/ Designated low-sulfur fuel. 5/ Does not meet the requirement of fuels of this grade.

6/ Produced and distributed in eastern Canada, north of districts A and C.

7/ Kinematic viscosity in centistokes at 100° F., not included in computation.

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TABLE 10.--Analyses of grade 6 burner fuel oils, 1956 (Cont.)

Southern region: District D

Item	Distributed in districts 1/	Gravity ASTM D287 °API	Flash point ASTM D93 °F	Viscosity, Furol at 122° F. ASTM D88 Sec.	Pour point ASTM D97 °F.	Sulfur content ASTM D129 Wt. pct.	Carbon residue Ramsbottom 2/ ASTM D524 On 100 percent sample, percent	Ash ASTM D482 Percent	Water and sediment ASTM D96 Vol. pct.
360	D	11.5	212	150	40	1.63	12.1	0.06	0.3
361	D, B	9.8	190	173	25	2.36	-	.07	.05
362	D, B, A	13.2	204	74	0	2.02	10.24	.017	.3
363	D, E, G	11.6	310	177	60	.724	9.91	.026	.20
320	A, D	7.3	208	203	15	1.61	13.03	.020	.4
333	B, A, D	10.9	195	139	35	1.80	-	.02	.2
334	B, A, D	10.8	194	150	40	.68	12	.07	.3
335	B, A, D, C	11.7	>160	140	20	2.18	-	.09	.30
340	B, C, D	14.3	285	145.1	20	.63	6.0	.04	.1
341	B, D	18.8	170	178.4	50	.58	15.0	.005	-
342	B, D, A	11.9	265	141.2	30	1.67	11.6	.08	.1
386	G, D	11.9	230	278	35	1.58	11.26	.055	.20
387	G, E, D	12.2	228	188	50	2.85	4.9	.07	.2
404	J, D, G	5.2	230	3/ 36.5	20	.70	9.4	.01	1.0
Average (14 samples)		11.5	-	155.2	-	1.50	10.49	0.045	0.28
Minimum		5.2	>160	36.5	0	0.58	4.9	0.005	0.05
Maximum		18.8	310	278	60	2.58	15.0	.09	1.0

Central region: Districts E, F, and G

364	E	12.6	180	201	30	4/ 0.88	11.00	0.05	0.15
365	E	12.6	188	256	35	5/ .99	12.80	.07	.18
366	E	6.6	255	134.2	35	.90	12.5	.02	.20
367	E	10.4	235	240	50	-	11.3	.5	.6
368	E	5.7	160	203	35	3.65	18.8	.042	.20
369	E	17.7	260	155	40	1.80	8.30	.049	.2
370	E	12.5	210	155	-	1.51	-	-	.3
371	E	-3.3	208	180	55	.766	15.82	.012	<.1
372	E, C	12.3	235	98.0	30	2.08	6.51	.05	.1
373	E, C	15.7	176	6/ (318.0)	-	.61	7.0	.013	-
374	E, C	5.8	170	238	35	.65	1.67	.05	.2
375	E, F	12.0	225	260	35	1.4	-	-	.15
376	E, F	12.8	240	291	55	.80	-	.05	.20
377	E, F, G	13.2	180	287	35	2.08	20.6	.031	.2
378	E, F, G, J	7.6	190	244	20	2.26	9.4	.01	.10
379	E, G	15.3	185	137	30	.76	4.11	.02	.25
380	E, G	16.0	190	120	-	1.30	4.2	.15	.3
381	F, L, E, H	5.3	210	222	35	3.7	16.9	.04	.10
382	G	-1.1	280	124	40	1.40	-	.30	.20
383	G	-.5	345	110	45	1.01	-	.008	.2
384	G	14.5	220	125	35	.86	8.87	.05	.1
385	G	14.2	230	286	45	.96	15.2	.06	.1
386	G, D	11.9	230	278	35	1.58	11.26	.055	.20
387	G, E, D	12.2	228	188	50	2.85	4.9	.07	.2
388	G, E, F	15.1	198	291.5	35	1.056	12.03	.042	.20
389	G, F, E	.8	194	290	40	1.96	20.0	.022	.1
390	G, F, I	15.6	200	285	40	1.2	-	.2	.2
391	G, I	2.1	235	52	25	.96	8.48	.01	.10
392	G, J	9.1	156	218	30	.55	12.1	.01	.2
356	C, E	8.5	235	3/ 28.2	5	.64	5.64	.015	.1
363	D, E, G	11.6	310	177	60	.724	9.91	.026	.20
404	J, D, G	5.2	230	3/ 36.5	20	.70	9.4	.01	1.0
Average (32 samples)		9.7	-	190.7	-	1.37	10.72	0.068	0.18
Minimum		-3.3	156	28.2	5	0.55	1.67	0.008	<0.1
Maximum		17.7	345	291.5	60	3.7	20.6	.5	1.0

1/ District letters refer to the areas in which the fuels are sold (see fig. 1). In each item the arrangement of district letters indicates in decreasing order the relative volumes of the fuel. Fuels listed above the lines separating items 363 and 320 in the Southern region and items 392 and 356 in the Central region are generally sold in greatest volume in those respective regions. The fuels listed below the lines are generally sold in lesser volumes in the respective regions than in some other region.

2/ Some of the determinations were made by the Conradson method, ASTM D189-52, and the data converted to Ramsbottom values using table 1 and figure 4 in the appendix of the Conradson method.

3/ Does not meet the requirement of fuels of this grade. 4/ Designated low-sulfur fuel. 5/ Designated high-sulfur fuel.

6/ Kinematic viscosity in centistokes at 100° F., not included in computation.

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TABLE 10.--Analyses of grade 6 burner fuel oils, 1956 (Cont.)

Rocky Mountain region: Districts H, I, J, and K

Item	Distributed in districts 1/	Gravity ASTM D287 °API	Viscosity, Flash point ASTM D93 °F	Viscosity, Furol at 122° F. ASTM D88 Sec.	Pour point ASTM D97 °F.	Sulfur content ASTM D129 Wt. pct.	Carbon residue Ramsbottom 2/ ASTM D524 On 100 percent sample, percent	Ash ASTM D482 Percent	Water and sediment ASTM D96 Vol. pct.
393	H	0.0	210	283	50	4.072	22.7	0.01	0.0
394	H, L, K	7.8	208	135.9	30	2.46	12.0	.02	.8
395	H, L, K, I	14.9	420	115	60	5.25	5.8	.07	.1
396	I	5.8	245	237.6	55	3.32	5.47	.02	Trace
397	I	12.6	320	216.7	65	.577	10.25	.013	.20
398	I	10.8	162	125	45	.58	10.4	.03	.20
399	I	7.4	222	151	36	2.95	13.8	.052	.1
400	I	10.5	150	130	35	3.0	8.0	.03	.3
401	J	8.0	183	129	25	1.42	14.9	.021	1.4
402	J	7.2	189	219	30	1.43	21.3	.025	1.6
403	J	2.9	>230	45	45	2.03	9.26	.02	.3
404	J, D, G	5.2	230	3/ 36.5	20	.70	9.4	.01	1.0
405	K	21.4	300	3/ 36.7	40	1.20	6.1	.01	.10
406	K	14.4	300	174	65	1.40	8.2	.02	.10
407	K	11.7	240	122	40	1.94	12.75	.03	.2
408	Western Canada 4/	4.9	188	60	35	.70	6.64	Trace	.6
409	Do 4/	16.8	260	45	55	1.12	5.85	.01	.2
410	Do 4/	10.0	>200	125	35	1.44	4.39	.01	<.1
378	E, F, G, J	7.6	190	244	20	2.26	9.4	.01	.10
381	F, L, E, H	5.3	210	222	35	3.7	16.9	.04	.10
390	G, F, I	15.6	200	285	40	1.2	-	.2	.2
391	G, I	2.1	235	52	25	.96	8.48	.01	.10
392	G, J	9.1	156	218	30	.55	12.1	.01	.2
Average (23 samples)		9.2	-	148.1	-	1.92	10.64	0.031	0.36
Minimum		0.0	150	36.5	20	0.55	4.39	Trace	0.0
Maximum		21.4	420	285	65	5.25	22.7	0.2	1.6

Western region: Districts L, M, and N

411	L	15.0	200	160	25	1.55	-	0.02	0.2
412	L, M	10.6	210	108	20	.77	15.9	.03	.20
413	L, M	9.9	220	172	30	.97	16.0	.04	.20
414	L, M, N	9.0	220	174	30	1.80	17.5	.05	.3
415	L, M, N	9.0	200	100	20	1.70	16.0	.05	.2
416	L, M, N	9.0	210	155	30	1.75	17.4	.05	.2
417	L, M, N	11.0	230	245	40	1.86	18.0	.06	.2
418	L, M, N	8.5	204	170	25	1.32	13.7	.06	.1
419	L, N	8.9	188	110	25	1.71	16.5	.08	.10
420	L, N	7.1	178	168	30	1.71	18.2	.06	.20
421	M, L	8.6	182	166	25	.93	-	.05	.10
422	M, N	9.7	198	170	20	1.35	12.1	.05	.1
423	M, N, L	10.0	210	118	30	1.78	14.0	.07	.1
424	M, N, L	11.5	188	178	-	1.80	15.5	.08	.1
425	N, L	9.2	196	172	30	1.58	-	.07	.1
426	N, M	8.8	188	105	15	.87	15.2	.02	.10
427	N, M	7.1	178	208	25	.89	17.7	.05	.10
381	F, L, E, H	5.3	210	222	35	3.7	16.9	.04	.10
394	H, L, K	7.8	208	135.9	30	2.46	12.0	.02	.8
395	H, L, K, I	14.9	420	115	60	5.25	5.8	.07	.1
408	Western Canada 4/	4.9	188	60	35	.70	6.64	Trace	.6
409	Do 4/	16.8	260	45	55	1.12	5.85	.01	.2
410	Do 4/	10.0	>200	125	35	1.44	4.39	.01	<.1
Average (23 samples)		9.7	-	147.0	-	1.70	13.76	0.05	0.2
Minimum		4.9	178	45	15	0.70	5.8	Trace	<0.1
Maximum		16.8	420	245	60	5.25	18.2	.08	.8

1/ District letters refer to the areas in which the fuels are sold (see fig. 1). In each item the arrangement of district letters indicates in decreasing order the relative volumes of the fuel. Fuels listed above the lines separating items 410 and 378 in the Rocky Mountain region and items 427 and 381 in the Western region are generally sold in greatest volume in those respective regions. The fuels listed below the lines are generally sold in lesser volumes in the respective regions than in some other regions.

2/ Some of the determinations were made by the Conradson method, ASTM D189-52, and the data were converted to Ramsbottom values using table 1 and figure 4 in the appendix of the Conradson method.

3/ Does not meet the requirement of fuels of this grade. 4/ Produced and distributed in western Canada, north of districts H and L.

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